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NATIONAL TECHNICAL INFORMATION SERVICE ● Joseph F. Caponio, Director

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GOVERNMENT REPORTS

Announcements & Index

Volume 85, Number 7 March 29, 1985

CONTENTS

About NTIS & How to Order ii
How to Use iii
Subject Category and Subcategory Structure iv
NTIS Products v
Reports Announcements 1
Keyword Index KW-1
Personal Author Index PA-1
Corporate Author Index CA-1
Contract/Grant Number Index CG-1
NTIS Order/Report Number Index OR-1
Price Codes ..... Outside Back Cover

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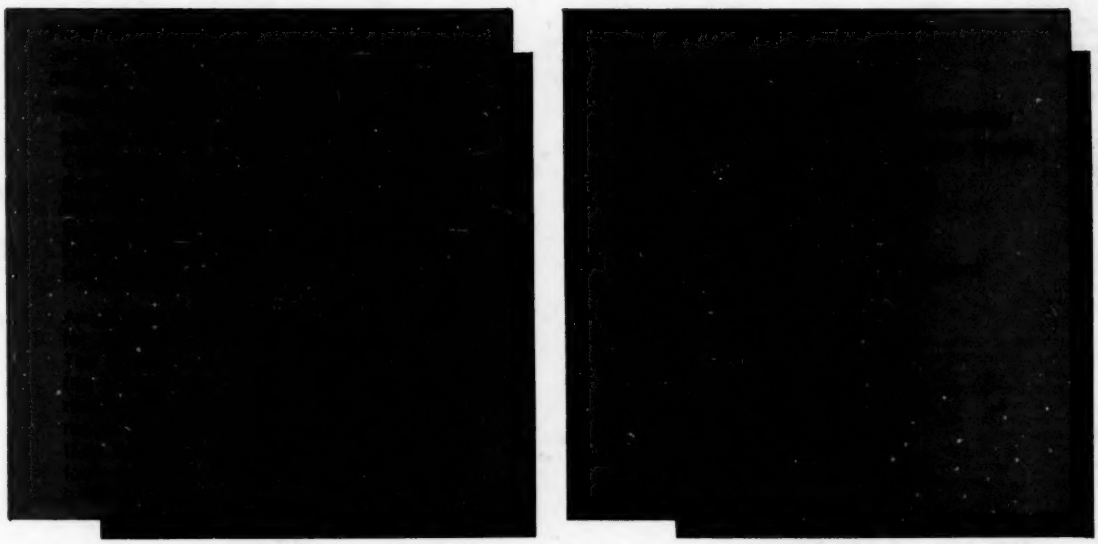

1. AERONAUTICS

1A. Aerodynamics

514,314

AD-A148 981/4/GAR PC **A06**/MF **A01**

Tennessee Univ. Space Inst., Tullahoma. Gasdynamics Div.

Aerodynamic Improvements by Discrete Wing Tip Jets.

Final rept. Sep 81-Nov 83,

J. M. Wu, and A. D. Vakili. Mar 84, 102p AFWAL-TR-84-3009

Contract F33615-81-K-3034

The effects of applying discrete wing tip jets on a rectangular wing and the generated flow field have been studied. Analysis included low speed wing tunnel testing, water tunnel testing and analytical modeling. Wing tip jet parameters investigated included number of jets, jet direction, shape of jets, and blowing coefficients. Tailoring of jet parameters to optimize planform circulation and flow separation were included. Flow interactions of the discrete tip jets with wing vorticies were successfully visualized with water tunnel techniques. (Author)

514,315

N85-12858/5/GAR PC**$6.00**

National Aeronautics and Space Administration, Washington, DC.

Aeronautical Engineering, a Continuing Bibliography with Indexes.

Nov 84, 153p NAS 1.21:7037(180), NASA-SP-7037(180)

This bibliography lists 546 reports, articles and other documents introduced into the NASA scientific and technical information system in October 1984.

514,316

N85-12860/1/GAR PC **A03**/MF **A01**

Stanford Univ., CA.

Study of Flow Past an Airfoil with a Jet Issuing from Its Lower Surface.
A. Krothapalli, and D. Leopold. Jun 84, 44p NAS 1.26:166610, NASA-CR-166610
Contracts NCC2-198, NAG2-111

The aerodynamics of a NACA 0018 airfoil with a rectangular jet of finite aspect ratio exiting from its lower surface at 90 deg to the chord were investigated. The jet was located at 50% of the wing chord. Measurements include static pressures on the airfoil surface, total pressures in the near wake, and local velocity vectors in different planes of the wake. The effects of jet cross flow interaction on the aerodynamics of the airfoil are studied. It is indicated that at all values of momentum coefficients, the jet cross flow interaction produces a strong contra-rotating vortex structure in the near wake. The flow behind the jet forms a closed recirculation region which extends up to a chord length down stream of the trailing edge which results in the flow field to become highly three dimensional. The various aerodynamic force coefficients vary significantly along the span of the wing. The results are compared with a jet flap configuration.

514,317
N85-12861/9/GAR PC **A03/MF A01**
Stanford Univ., CA.
Viscous-Inviscid Aerodynamic Analysis of Two-Dimensional Thrust Augmentors.
D. A. Tavella, and L. Roberts. Mar 84, 44p NAS 1.26:177321, NASA-CR-177321
Contract NCC2-150

A theory for the computation of two-dimensional thrust augmentor performance is developed. The flow field is assumed to be incompressible, of uniform density and statistically steady. The flow in and around the augmentor is assumed to consist of an outer, inviscid part and an inner, viscous part. The outer field is calculated analytically and then matched with the inner, viscous field, which is computed by means of integral methods. This form of analysis leads to a simple and economical approach, particularly useful for conducting parametric studies. The theoretical results are compared with recently acquired experimental data.

514,318
N85-12862/7/GAR PC **A04/MF A01**
National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Ce..er.
Application of the Onera Model of Dynamic Stall.
K. W. Mcalister, O. Lambert, and D. Petot. Nov 84, 85p NAS 1.60:2399, A-9824, NASA-TP-2399

A semiempirical model to predict the unsteady loads on an airfoil that is experiencing dynamic stall, is investigated. The mathematical model is described from an engineering point of view, demonstrates the procedure for obtaining various empirical parameters, and compares the loads predicted by the model with those obtained in the experiment. It is found that the procedure is straightforward, and the final calculations are in qualitative agreement with the experimental results. Comparisons between calculations and measurements also indicate that a decrease in accuracy results when the values of both the reduced frequency and the amplitude of oscillation are large. Potential quantitative improvements in the accuracy of the calculations are discussed for accounting of both the hysteresis in the static data and the effects of stall delay in the governing equations.

514,319
N85-12863/5/GAR PC **A03/MF A01**
Vigyan Research Associates, Inc., Hampton, VA.
Natural Laminar Flow Airfoil Design Considerations for Winglets on Low-Speed Airplanes.
C. P. Vandam. Dec 84, 28p NAS 1.26:3853, NASA-CR-3853
Contract NAS1-17797

Winglet airfoil section characteristics which significantly influence cruise performance and handling qualities of an airplane are discussed. A good winglet design requires an airfoil section with a low cruise drag coefficient, a high maximum lift coefficient, and a gradual and steady movement of the boundary layer transition location with angle of attack. The first design requirement provides a low crossover lift coefficient of airplane drag polars with winglets off and on. The other requirements prevent nonlinear changes in airplane lateral/directional stability and control characteristics. These requirements are considered in the design of a natural laminar flow airfoil section for winglet applications and chord Reynolds number of 1 to 4 million.

514,320
N85-12866/8/GAR PC **A02/MF A01**
National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
Development of Computational Fluid Dynamics at NASA Ames Research Center.
M. Inouye. Oct 84, 10p NAS 1.15:86021, A-9887, NASA-TM-86021

Ames Research Center has the lead role among NASA centers to conduct research in computational fluid dynamics. The past, the present, and the future prospects in this field are reviewed. Past accomplishments include pioneering computer simulations of fluid dynamics problems that have made computers valuable in complementing wind tunnels for aerodynamic research. The present facilities include the most powerful computers built in the United States. Three examples of viscous flow simulations are presented: an afterbody with an exhaust plume, a blunt fin mounted on a flat plate, and the Space Shuttle. The future prospects include implementation of the Numerical Aerodynamic Simulation Processing System that will provide the capability for solving the viscous flow field around an aircraft in a matter of minutes.

514,321
N85-12868/4/GAR PC **A02/MF A01**
National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
Comparison of Wortmann Airfoil Computer-Generated Lift and Drag Polars with Flight and Wind Tunnel Results.
A. H. Bowers, and A. G. Sim. Nov 84, 16p NAS 1.15:86035, H-1231, NASA-TM-86035
Prepared in Cooperation with NASA. Dryden Flight Research Center.

Computations of drag polars for a low-speed Wortmann sailplane airfoil are compared with both wind tunnel and flight test results. Excellent correlation was shown to exist between computations and flight results except when separated flow regimes were encountered. Smoothness of the input coordinates to the PROFILE computer program was found to be essential to obtain accurate comparisons of drag polars or transition location to either the flight or wind tunnel flight results.

514,322
N85-12870/0/GAR PC **A03/MF A01**
Vanderbilt Univ., Nashville, TN. School of Engineering.
Role of Freestream Turbulence Scale in Subsonic Flow Separation.
Interim Report, 1 Jul. 1984 - 31 Dec. 1984.
J. L. Potter, W. R. Seebaugh, R. J. Barnett, and R. B. Gokhale. 31 Dec 84, 35p NAS 1.26:174172, IPR-1, NASA-CR-174172
Contract NAG1-483

The ojective of this work is the clarification of the role of freestream turbulence scale in determining the location of boundary layer separation. An airfoil in subsonic wind tunnel flow is the specific case studied. Hot-film and hot-wire anemometry, liquid-film visualization and pressure measurements are the principal diagnostic techniques in use. The Vanderbilt University subsonic wind tunnel is the flow facility being used.

514,323
N85-12871/8/GAR PC **A02/MF A01**
North Carolina State Univ. at Raleigh.
Physics on Aircraft Wakes.
Progress Report, 15 May - 14 Nov. 1984.
H. A. Hassan. 1984, 14p NAS 1.26:174105, PR-1, NASA-CR-174105
Contract NCC1-84

The roll-up of a vortex sheet is analyzed by two approaches. The first is based on exact compressible Euler equations while the second is based on the exact incompressible Navier-Stokes equations. The inviscid calculations for the two-dimensional problem do not indicate any roll-up of the sheet. On the other hand, the viscous calculations capture the dynamics of the roll-up rather well. This suggests that the generally held views regarding the roll-up process of aircraft wakes, namely, that it be treated as an inviscid process, may not be completely accurate.

514,324
N85-12872/6/GAR PC **A05/MF A01**
Institut Franco-Allemand de Recherches, Saint-Louis (France).
Etude Par Anemometrie Laser d'Ecoulements Decolles sur des Profils d'Aile (Laser Anemometer Study of Separated Flow on Wing Profiles).
B. C. Jaeggy, and P. Meyer. 17 May 83, 79p ISL-CO-214/83
Contract DRET-82/318
Text in French. Presented at Dfvlr Zentrums Conf., Brunswick, 5 May 1983.

Subsonic wind tunnel tests were carried out using a 2 dimensional laser velocimeter on the NACA 65213 and RA 16 SC1 profiles. The results show the average velocity components and the turbulent parameters in the separated flow. The influence of a spoiler on an RA 16 SC1 profile was also examined. The efficiency of the numerical methods to describe the results is discussed.

514,325
N85-13682/8/GAR PC **A04/MF A01**
Office National d'Etudes et de Recherches Aerospatiales, Paris (France).
Premiers Essais Cryogeniques du Profil Cast 7 a la Souffleric T2. Comparaisons Avec les Calculs (First Cryogenic Test of the Cast 7 Profile in the T2 Wind Tunnel. Comparison with Calculations).
A. Mignosi, and R. Imbert. Apr 84, 66p ONERA-RTS-58/1685-AY-035-D
Contract DRET-83-34-135
Text in French.

The influence of the Reynolds number at 0.76 M was studied in natural and enhanced transition using a CAST 7 airfoil profile with 150 mm cord. The wind tunnel and the experimental technique are described. Studies on wall choice and on the thermal equilibrium of the model are included. Computations solving the transonic potential equation with inclusion of viscous effects are presented. Important differences between experiment and theory are observed.

514,326
PB85-141703/GAR PC **E04/MF E04**
Association Aeronautique et Astronautique de France, Paris.
Precision des Essais de 1/2 Maquettes Motorisees a S2MA (Half Powered Model Tests in the Modane Center),
J. F. Piat. Nov 84, 26p AAAF-NT-84-22-B

For several years, civilian aircraft half model with turbine bower simulator (TPS) motorized nacelle have been tested in S2MA ONERA wind tunnel. In a typical test, drag comparison are carried out between different configurations; so, repeatibility of measurements is essential. The method used to estimate it, is described in this report. The accuracy reached during a recent test is presented. Discrimination level of one drag count is possible with a good confidence.

514,327
PB85-144533/GAR PC **E04/MF E04**
Institut Franco-Allemand de Recherches, Saint-Louis (France).
Possibilites d'Application de l'Anemometrie Laser a l'Etude de l'Interaction Cho/Couche Limite en Transsonique (Possibilities of Applying Laser Anemometry to an Investigation of the Interaction Shock/Boundary Layer in Transonic Flight),
H. J. Schaefer, G. Horny, H. J. Pfeifer, and E. Stanewsky. 7 Dec 83, 55p ISL-R-131/83
Text in German, summaries in French and German. Sponsored by Centre de Documentation de l'Armement, Paris (France). Direction des Recherches, Etudes et Techniques.

A laser-Doppler anemometer was used in the measuring section of the transonic windtunnel in Goettingen to investigate flows around wing (profiles) with compression shocks and separated areas. Two different flow conditions were realized marked by the features that, in the first case, no separation occurred, whereas in the second case there was a shock-induced separation. The results of laser anemometry are reproduced in the form of two-dimensional Mach-number distributions. The good agreement with analogue results from conventional probe measurements and with model calculations promises that the laser anemometer can be used successfully in a quantitative analysis of shock - boundary-layer interferences on transonic wing profiles.

1B. Aeronautics

514,328
AD-A148 984/8/GAR PC **A05/MF A01**
Army Military Personnel Center, Alexandria, VA.
Methodology for the Determination of Rotary Wing Aircraft Vulnerabilities in Air-to-Air Combat Simulation.
Final rept.,
K. L. Travis. 23 Nov 84, 87p

This research effort proposes a methodology to calculate an aircraft's vulnerability in an air-to-air engagement. The primal processes of such an engagement--detection, acquisition, missile launch, missile intercept and probability of kill--are modeled using an electro-optical device as the source of target detection. The resultant probability of kill is depicted as a function range or a given aspect angle. This constitutes an enhancement over the traditional kill/no kill representation in that the entire distribution may be obtained for the selected engagement angle. Since little historical or actual test data is available for comparison, evaluation requirements for such a conceptual methodology is discusses. A recalibration process is recommended which will allow the refinement of the model as tests are conducted and observed data becomes available. Applications of the methodology results are recommended for the areas of research and development and pilot tactical training. A pilot decision logic based upon the results of executing the methodology is proposed.

514,329
AD-A149 025/9/GAR PC **A14/MF A01**
Advisory Group for Aerospace Research and Development, Neuilly-sur-Seine (France).
Conference Proceedings of Operational Loads Data Held at Sienna, Italy on 2-6 April 1984.
D. M. Holford, J. R. Sturgeon, J. T. Johnson, R. E. Pinckert, and R. A. Melliere. Aug 84, 301p Rept no. AGARD-CP-375

The aim of this Meeting was to examine the general principles followed in acquiring data on operational loads sustained by NATO aircraft, both fixed and rotary wing, in normal service and to compare current and developing loads data acquisition programmes. The techniques used and data obtained from work on a variety of aircraft types were reported; microprocessor-based systems were seen as providing the essential technology for major advances in this field. Although the main emphasis was on fatigue loads, the acquisition of design loads data was also discussed, together with the validity of current data bases for loads calculations on high-agility designs representative of the next generation of combat aircraft.

514,330
PB85-143741/GAR PC **E04/MF E04**
Civil Aviation Authority, London (England).
Aeronautical Radio Station Operators' Guide.
c1984, 38p ISBN-0-86039-225-2, CAP-452

This publication is intended as a guide for persons other than licensed air traffic controllers or aerodrome flight information service officers who are operating or wish to operate an aeronautical ground radio station. It is based on the International Standards and Recommended Practices for Aeronautical Communications contained in ICAO Annex 10, Vol 2 (Communication Procedures) to the Convention on International Aviation. (Copyright (c) Civil Aviation Authority 1984.)

1C. Aircraft

514,331
AD-A148 954/1/GAR PC **A04/MF A01**
Aeronautical Systems Div., Wright-Patterson AFB, OH.
Evaluation of the Birdstrike Threat to the F-15 Present Fleet, Rapid Deployment Force, and Dual Role Fighter Transparencies.
Technical rept.,
P. Kolodziejczyk. Sep 84, 57p Rept no. ASD-TR-84-5026

The information contained in this report is developed form analytical and empirical techniques used to establish statistical models for evaluating the birdstrike threat to the F-15 aircraft transparencies. Consideration is given to two areas: (1) the operational impact rate for specific aircraft usage profiles, and (2) the probability of a random birdstrike which could result in penetration of the aircraft cockpit. (Author).

514,332
AD-A149 053/1/GAR PC **A03/MF A01**
Aeronautical Research Labs., Melbourne (Australia).
Long Term Durability of Urea Formaldehyde Glued Joints Removed from Vampire Aircraft.
Technical memo.,
T. Van Blaricum, and C. A. Patching. Jun 84, 27p Rept no. ARL-STRUC-TM-381

Two Vampire fuselages originally manufactured in 1950 were used for the Australian Aeronautical Research Lab.'s Vampire Wing Fatigue Tests carried out between 1960 and 1965. The Vampire fuselage is of laminated wooden monocoque construction using spruce, improved wood and aircraft plywood, bonded with Urea Formaldehyde glue. After completion of the wing fatigue tests a number of wooden specimens were removed from these fuselages and stored under ambient laboratory conditions until Sept. 1983. At the time of specimen removal, the fuselages had been subjected to a total of 67,238 and 42,279 hours actual flying and simulated life. Careful inspection of the fuselages before removal of the specimens revealed on indication of any defect indicating that design strength requirements were not being met. This report describes the condition of the wooden joints from these specimens, broken open in Sept. 1983. At this time the glue bonds had reached a life of 33 years. This report concludes that long term exposure (18 years) of these wooden specimens to an ambient laboratory environment had not led to any significant deterioration of the Urea Formaldehyde bonded joints, and that after 33 years since manufacture the joints were still satisfactory.

514,333
AD-A149 054/9/GAR PC **A04/MF A01**
Aeronautical Research Labs., Melbourne (Australia).
Improving the Fatigue Life of the Mirage IIIO Wing Main Spar.
Structures rept.,
J. Y. Mann, A. S. Machin, and W. F. Lupson. Jan 84, 72p Rept no. ARL-STRUC-R-398

An increased life-of-type requirement for Mirage IIIO aircraft operated by the RAAF was associated with a specific need to develop a refurbishment technique for extending the lives of fatigue-cracked wing main spars. This led to a comprehensive series of flight-by-flight fatigue tests on specimens of a geometry and thickness (32 mm) closely representing the inboard lower rear flange section of the spar. Of the various options investigated, the most promising was the use of interference-fit steel bushes in bolt holes-either alone or in combination with a modified anchor-nut sub-assembly which eliminated the need for some rivets in the spar flange. Specimens with oversize reamed holes using oversized sleeved bolts performed poorly. Cold-expansion of the critical bolt hole using the Boeing split-sleeve process was unsatisfactory because of small hole-to-spar edge distances and the proximity of small rivet holes. This investigation has shown that acceptable extensions in fatigue life for wing main spars of the Mirage IIIO are possible by use of combinations of standard bolts and 0.3% interference-fit steel bushes (of 1.5 mm wall thickness) in the critical bolt holes, with the provisos that pre-existing fatigue cracks are completely removed and that (after reworking) bolt hole/rivet hole separation distances are adequate. In some circumstances acceptable increases in life may be obtained by reducing the outside diameter of the bush and using stepped undersize bolts.

514,334
N85-12884/1/GAR PC **A03/MF A01**
National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
Flight and Wind-Tunnel Comparisons of the Inlet-Airframe Interaction of the F-15 Airplane.
L. D. Webb, D. Andriyich-varda, and S. A. Whitmore. Nov 84, 35p NAS 1.60:2374, H-1175, NASA-TP-2374

The design of inlets and nozzles and their interactions with the airplane which may account for a large percentage of the total drag of modern high performance aircraft is discussed. The inlet/airframe interactions program and the flight tests conducted is described. Inlet drag and lift data from a 7.5% wind-tunnel model are compared with data from an F-15 airplane with instrumentation to match the model. Pressure coefficient variations with variable cowl angles, capture ratios, examples of flow interactions and angles of attack are for Mach numbers of 0.6, 0.9, 1.2, and 1.5 are presented.

514,335
N85-12886/6/GAR PC **A04/MF A01**
Societe Nationale Industrielle Aerospatiale, Suresnes (France). Lab. Central.
Les Materiaux Structuraux Modernes Situation Actuelles et Perspectives d'Evolution (Modern Structural Materials. Present Situation and Evolution Prospects).
G. Hilaire. 14 Aug 84, 60p SNIAS-842-551-101
Text in French. Presented at Semaine Aeron. G.I.F.a.S., Madrid, 12-15 Jun. 1984.

The properties of light alloys, composites, steels and titanium alloys used in aircraft construction are reviewed. The mechanical properties, including tensile strength, modulus and fatigue resistance, and the economic factors are compared. It is shown that the finished products of carbon reinforced plastic materials have costs of the same order as those manufactured with light alloys. The prospects of aluminum, lithium alloys, powder metallurgy and metallic matrix composites are discussed. The applications of new materials in aircraft, helicopters and engines are examined.

514,336
N85-12888/2/GAR PC **A05/MF A01**
Eidgenoessisches Flugzeugwerk, Emmen (Switzerland).
Graphische Software Zur Darstellung der Deformationsbewegung Eines Koerpers (Graphics Software for the Display of Body Deformation Motion).
G. Mandanis. 6 Jan 83, 76p FW-FO-1640
Text in German.

Three programs for graphic display of the characteristic mode of aircraft structures were elaborated. They are interactive and affect geometrical data; deformation structure; and alternative nodal line display, respectively. The system can also be used for the display of objects other than aircraft.

514,337
N85-12901/3/GAR PC **A10/MF A01**
United Technologies Research Center, East Hartford, CT.
High-Temperature Optically Activated GaAs Power Switching for Aircraft Digital Electronic Control.
J. M. Berak, D. H. Grantham, J. L. Swindal, J. F. Black, and L. B. Allen. May 83, 201p NAS 1.26:174711, UTRC-R83-925312-25, NASA-CR-174711
Contract NAS3-22535

Gallium arsenide high-temperature devices were fabricated and assembled into an optically activated pulse-width-modulated power control for a torque motor typical of the kinds used in jet engine actuators. A bipolar heterojunction phototransistor with gallium aluminum arsenide emitter/window, a gallium arsenide junction field-effect power transistor and a gallium arsenide transient protection diode were designed and fabricated. A high-temperature fiber optic/phototransistor coupling scheme was implemented. The devices assembled into the demonstrator were successfully tested at 250 C, proving the feasibility of actuator-located switching of control power using optical signals transmitted by fibers. Assessments of the efficiency and technical merits were made for extension of this high-temperature technology to local conversion of optical power to electrical power and its control at levels useful for driving actuators. Optical power sources included in the comparisons were an infrared light-emitting diode, an injection laser diode, tungsten-halogen lamps and arc lamps. Optical-to-electrical power conversion was limited to photovoltaics located at the actuator. Impedance matching of the photovoltaic array to the load was considered over the full temperature range, -55 C to 260 C. Loss of photovoltaic efficiency at higher temperatures was taken into account. Serious losses in efficiency are: (1) in the optical source and the cooling which they may require in the assumed 125 C ambient, (2) in the decreased conversion efficiency of the gallium arsenide photovoltaic at 260 C, and (3) in impedance matching. Practical systems require improvements in these areas.

514,338
N85-13267/8/GAR PC **A04/MF A01**

National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
Full-Scale Crash-Test Evaluation of Two Load-Limiting Subfloors for General Aviation Airframes.
H. D. Carden. Dec 84, 60p NAS 1.60:2380, L-15764, NASA-TP-2380

Three six place, low wing, twin engine general aviation airplane test specimens were crash tested at the Langley Impact Dynamics Research Facility under controlled free flight conditions. One structurally unmodified airplane was the base line specimen for the test series. The other two airplanes were structurally modified to incorporate load limiting (energy absorbing) subfloor concepts into the structure for full scale crash test evaluation and for comparison with the unmodified airplane test results. Typically, the lowest floor accelerations, the lowest anthropomorphic dummy responses, and the least seat crushing of standard and load limiting seats occurred in the airplanes modified with load limiting subfloors, wherein the greatest structural crushing of the subfloor took place. The better performing of the two load limiting subfloor concepts reduced the peak airplane floor accelerations to -25g to -30g as compared with approximately -40g to -55g for the unmodified airplane structure.

514,339
N85-13269/4/GAR PC **A05**/MF **A01**
Boeing Commercial Airplane Co., Seattle, WA.
Flutter Parametric Studies of Cantilevered Twin-Engine-Transport Type Wing with and Without Winglet. Volume 1: Low-Speed Investigations.
Final Report, Dec. 1983 - Sep. 1984.
K. G. Bhatia, and K. S. Nagaraja. Sep 84, 95p NAS 1.26:172410-V-1, NASA-CR-172410-V-1
Contract NAS1-17539

Flutter characteristics of a cantilevered high aspect ratio wing with winglet were investigated. The configuration represented a current technology, twin-engine airplane. A low-speed and high-speed model were used to evaluate compressibility effects through transonic Mach numbers and a wide range of mass-density ratios. Four flutter mechanisms were obtained in test, as well as analysis from various combinations of configuration parameters. The coupling between wing tip vertical and chordwise motions was shown to have significant effect under some conditions. It is concluded that for the flutter model configurations studied, the winglet related flutter was amenable to the conventional flutter analysis techniques.

514,340
N85-13270/2/GAR PC **A07**/MF **A01**
Boeing Commercial Airplane Co., Seattle, WA.
Flutter Parametric Studies of Cantilevered Twin-Engine Transport Type Wing with and Without Winglet. Volume 2: Transonic and Density Effect Investigations.
Final Report, Dec. 1983 - Sep. 1984.
K. G. Bhatia, and K. S. Nagaraja. Sep 84, 144p NAS 1.26:172410-V-2, NASA-CR-172410-V-2
Contract NAS1-17539

Flutter characteristics of a cantilevered high aspect ratio wing with winglet were investigated. The configuration represented a current technology, twin engine airplane. Compressibility effects through transonic Mach numbers and a wide range of mass-density ratios were evaluated on a low speed and high speed model. Four flutter mechanisms were obtained from test, and analysis from various combinations of configuration parameters. It is shown that the coupling between wing tip vertical and chordwise motions have significant effect under some conditions. It is concluded that for the flutter model configurations studied, the winglet related flutter is amenable to the conventional flutter analysis techniques. The low speed model flutter and the high-speed model flutter results are described.

1D. Aircraft Flight Control and Instrumentation

514,341
N85-12889/0/GAR PC **A04**/MF **A01**
McDonnell Douglas Corp., Long Beach, CA.
System Status Display Information.
L. G. Summers, and J. B. Erickson. 17 Oct 84, 73p NAS 1.26:172347, MDC-J2616, NASA-CR-172347
Contract NAS1-16202

The system Status Display is an electronic display system which provides the flight crew with enhanced capabilities for monitoring and managing aircraft systems. Guidelines for the design of the electronic system displays were established. The technical approach involved the application of a system engineering approach to the design of candidate displays and the evaluation of a Hernative concepts by part-task simulation. The system engineering and selection of candidate displays are covered.

514,342
N85-13478/1/GAR PC **A03**/MF **A01**
Michigan Univ., Ann Arbor.
Unified Method for Evaluating Real-Time Computer Controllers: A Case Study.
K. G. Shin, C. M. Krishna, and Y. H. Lee. 1982, 45p NAS 1.26:174168, NASA-CR-174168
Contract NAG1-296

A real time control system consists of a synergistic pair, that is, a controlled process and a controller computer. Performance measures for real time controller computers are defined on the basis of the nature of this synergistic pair. A case study of a typical critical controlled process is presented in the context of new performance measures that express the performance of both controlled processes and real time controllers (taken as a unit) on the basis of a single variable: controller response time. Controller response time is a function of current system state, system failure rate, electrical and/or magnetic interference, etc., and is therefore a random variable. Control overhead is expressed as a monotonically nondecreasing function of the response time and the system suffers catastrophic failure, or dynamic failure, if the response time for a control task exceeds the corresponding system hard deadline, if any. A rigorous probabilistic approach is used to estimate the performance measures. The controlled process chosen for study is an aircraft in the final stages of descent, just prior to landing. First, the performance measures for the controller are presented. Secondly, control algorithms for solving the landing problem are discussed and finally the impact of the performance measures on the problem is analyzed.

514,343
PB85-140853/GAR PC **E04**/MF **E04**
Office National d'Etudes et de Recherches Aerospatiales, Chatillon-sous-Bagneux (France).
Robustesse des Regulateurs de Pilotage Multivariables Continus: Synthese de l'Etude (Strength of Continuous Multivariable Piloting Regulators: Study Synthesis),
O. L. Mercier. 26 Jun 84, 29p TR-12/7224/SY
Text in French. Sponsored by Centre de Documentation de l'Armement, Paris (France). Direction des Recherches, Etudes et Techniques.

A synthesis of the state of the art and present knowledge in the area of quantification and improvement of the strength or insensitivity properties of a multivariable regulation schema has been undertaken. New solutions, particularly adapted to the specificities of piloting regulators, are presented and compared with other techniques, especially in the frequency sector. Recommendations are offered for a strong regulation, associating all these results. These results are applied to the improvement of a two-level regulator for multivariable piloting of a military plane. A performing logic is presented to facilitate this improvement and to give the aircraft good pilotability properties, while at the same time optimizing the strength of its regulation. This document represents a digest of the Technical Report 11/7224 SY, in which all these aspects are more thoroughly detailed.

514,344
PB85-141570/GAR PC **E08**/MF **E08**
Office National d'Etudes et de Recherches Aerospatiales, Chatillon-sous-Bagneux (France).
Robustesse de Regulateurs de Pilotage Multivariables (Strength of Multivariable Piloting Regulators),
O. L. Mercier. 26 Jun 84, 153p TR-11/7224/SY
Text in French. Sponsored by Centre de Documentation de l'Armement, Paris (France). Direction des Recherches, Etudes et Techniques.

This report presents a synthesis of the state of the art and present knowledge in the sector of quantification and improvement of the strength properties (tolerance of additive model errors and dynamic multiplicative perturbations in the return chains) of a schema of multivariable regulation. New solutions (joint consideration of additive and multiplicative perturbations, case of dynamic perturbations, characterization of a multivariable margin of stability) are presented and compared with the other techniques, chiefly in the frequency range. Recommendations are made for a strong regulation, associating all these results. These results are applied to the improvement of a two-level regulator for multivariable piloting of a military aircraft. A performing logic is presented to facilitate this improvement and to give the aircraft good pilotability properties, optimizing at the same time the stength of its regulation. The document RTS No. 12/7224 SY, (PB85-140853), distributed separately, represents a digest of the principal results shown here.

1E. Air Facilities

514,345
AD-A148 967/3/GAR PC **A06**/MF **A01**
Systems Control Technology, Inc., West Palm Beach, FL.
Structural Design Guidelines for Heliports.
Final rept. 5 Dec 83-10 Sep 84,
C. W. Schwartz, M. W. Witczak, and R. B. Leahy. 24 Oct 84, 116p DOT/FAA/PM-84/23
Contract A01-80-C-10080
Prepared in cooperation with Maryland Univ., College Park. Dept. of Civil Engineering.

Current structural design guidelines for heliports are analyzed using data obtained from the literature and from surveys of helicopter manufacturers, heliport design consultants, and heliport operators. Primary topics of interest in these analyses are the loads on heliport structures caused by helicopter hard landings, rotor downwash, and helicopter vibrations. A new analysis, based on reliability theory, is proposed for determining the helicopter hard landing load magnitudes appropriate for structural design. Results from this analysis indicate that the current FAA heliport structural design guidelines are adequate for medium to high volume heliports and conservative for low volume facilities. Additional analyses indicate that rotor downwash pressures and helicopter-induced vibrations are not critical loading conditions for most heliport structures. Guidelines for appropriate load combinations for heliport structural design are also presented.

2. AGRICULTURE

2B. Agricultural Economics

514,346
PB85-133635/GAR PC **A05**/MF **A01**
Instituto de Investigacion y Formacion Cooperativista, Tegucigalpa (Honduras).
Study of the Cooperative Movement in Honduras,
J. St. Siegens, R. A. Rosa, and V. Ramirez. Nov 82, 100p AID-PN-AAL-422
Grant AID/SOD/PDC-G-0176
Sponsored by Agricultural Cooperative Development International, Washington, DC.

A random sample survey of 139 of Honduras's 663 cooperatives was conducted to provide reliable data for future development of that country's cooperative movement. Results of the survey are presented in this report. Treatment is given to the historical development of the cooperative movement, as well as to its structure and methods, current legal status, use of technology, and contribution to the economy. Eleven subsectors are discussed, of which the agricultural

subsector is by far dominant. Succeeding sections of the study treat the relation of the cooperative movement to the state, with a focus on the semi-autonomous Directorate for Cooperative Development (DIFOCOOP); prospects for new cooperative legislation; and institutions offering education in cooperativism. A list of foreign donors to the cooperative movement concludes the study.

514,347
PB85-134740/GAR PC **A02/MF A01**
Finafrica Foundation, Milan (Italy).
Rural Financial Markets and Income Distribution in Low Income Countries, Excerpt from Savings and Development,
D. W. Adams. 1981, 12p AID-PN-AAL-432

It is widely assumed that financial markets have little impact on income distribution in low-income countries and that a few carefully chosen policies, e.g., providing low-cost agricultural credit, can manipulate markets in favor of the rural poor. This paper argues that, on the contrary, the availability of cheap credit in most low-income countries is aggravating inequitable income distribution.

514,348
PB85-138923/GAR PC **A03/MF A01**
Economic Research Service, Washington, DC. National Economics Div.
Federal Credit Programs for Agriculture: Background for 1985 Farm Legislation.
Agriculture information bull.,
R. Meekhof. Nov 84, 40p AIB-483

Federal credit assistance programs were developed in the early 1900's to overcome deficiencies in agricultural capital markets and respond to the problems of poverty, tenancy, and disenfranchisement. Federal credit policies, implemented primarily by the Farmers Home Administration and the Farm Credit System, have had a significant impact on the transformation which has taken place in agriculture and on farmers' access to capital. Agriculture continues to be a major recipient of Federal credit assistance. The agencies and institutions providing such assistance now hold about 40 percent of all farm debt.

514,349
PB85-140150/GAR PC **A04/MF A01**
Agency for International Development, Washington, DC. Office of Evaluation.
Private Sector: Regulation of Rural Markets in Africa.
Special study,
R. H. Bates. Jun 83, 69p AID EVALUATION SS-14, AID-PN-AAL-014

In Africa, government agricultural pricing policies often undermine production incentives. So concludes this study of the forms and effects of government intervention in rural African agricultural markets. The authors first review government regulation of African export crops, including coffee, cocoa, palm oil, cotton, sugar, and bananas. Although privately produced, these crops are required by law to be sold through state-controlled marketing boards originally designed to stabilize prices for the benefit of farmers. Instead, the boards have heavily taxed export crops in order to finance development of nonfarm sectors, obtain foreign exchange, and pay their own high operating costs. As a result, prices received by farmers for their crops are often less than half of international prices. Many farmers have responded by shifting to production of less heavily taxed crops, and high marketing costs imposed by the boards have played a part in dramatic declines in exports from Nigeria, Senegal, Ghana, and the Sudan. Export crop producers are also burdened by the high level of currency overvaluation in many African countries which further undermines production by reducing the value of export earnings. In the second part of the paper, the authors show how African governments regulate domestic food prices. Marketing bureaucracies act to lower food prices but in so doing increase marketing costs and price inefficiency and weaken production incentives. In a final section, a proposal is presented for reforming the marketing boards which would entail allowing markets to make and retain a limited amount of profits to encourage efficient operation.

514,350
PB85-141661/GAR PC **A02/MF A01**
Consortium for International Development, Tucson, AZ.
Population Growth and Development in Egypt: Farmers' and Rural Development Officials' Perspectives,
E. C. Knop, M. S. Sallam, and S. A. Knop. 27 Jul 82, 25p AID-PN-AAL-731
Contract AID/NE-C-1351
Also pub. as Egypt Water Use and Management Project, Cairo rept. no. EWUP/TR-18. Prepared in cooperation with Colorado State Univ., Fort Collins. Engineering Research Center.

Egyptian farmers and rural development officials were surveyed regarding their concerns and beliefs as to the relative importance of population growth as a limiting factor to improvement in local living conditions. This paper examines the characteristics of those farmers and officials who gave higher and lower priority to these limitations, and what strategy options they favored.

514,351
PB85-142644/GAR PC **A11/MF A01**
International Rice Research Inst., Los Banos, Laguna (Philippines).
Landless Workers and Rice Farmers: Peasant Subclasses Under Agrarian Reform in Two Philippine Villages,
A. J. Ledesma. 1982, 229p AID-PN-AAM-512

Share tenancy on rice farms in the Philippines was abolished in 1972 to provide more equitable income and land distribution to tillers of the soil. This study examines the benefits and burdens of land reform as perceived by three peasant subgroups - amortizing owners, permanent lessees, and landless workers in two villages, Abangay and Rajal Sur. Part I of the study focuses on the basic differences at the household level between landless workers and rice farmers. Discussed are the labor, income, and credit needs of one landless worker's family. Part II examines at the village level the formation of the three peasant subclasses mentioned above after initiation of agrarian reform.

514,352
PB85-142651/GAR PC **A06/MF A01**
International Rice Research Inst., Los Banos, Laguna (Philippines).
Report of an Exploratory Workshop on the Role of Anthropologists and other Social Scientists in Interdisciplinary Teams Developing Improved Food Production Technology.
1982, 107p AID-PN-AAM-509

In response to increasing awareness that sociocultural factors must be considered if the full effects of applied agricultural research are to be realized, a workshop was held at the International Rice Research Institute in 3/81 to explore the strengths and weaknesses of anthropology and related social sciences for interdisciplinary research in food production technology. The following topics are covered: (1) interdisciplinary development and the transfer of postharvest technology at the International Potato Center; (2) social organization and small watershed development; (3) rice insect pest management technology and its transfer to small farmers in the Philippines; (4) the anthropologist's role in helping to adapt Western technology during the Masai Livestock and Range Development Project in Tanzania; (5) socioeconomic use of aerial survey and intervention testing for interdisciplinary research.

514,353
PB85-143014/GAR PC **A02/MF A01**
Ohio State Univ., Columbus. Dept. of Agricultural Economics and Rural Sociology.
Effects of Low Interest Rates on the Poor in Low Income Countries,
D. W. Adams, and R. L. Meyer. 19 Feb 82, 15p AID-PN-AAL-676

Four problems encountered in efforts to help the poor in low-income countries through cheap agricultural credit policies are reviewed in this paper. These arguments are that: (1) cheap credit policies force intermediaries to pay low rates on financial deposits, thus giving savers a lower rate of return and providing intermediaries with fewer deposit services; (2) loan leverage is inequitable, as lenders try to minimize their lending costs by stressing large loans to established borrowers; (3) when inflation causes real interest rates to be negative, purchasing power is transferred from lenders (or savers) to borrowers, to whom credit thus becomes a form of subsidy; and (4) loan default rates of 40-60% are common, seriously undermining the vitality of many financial intermediaries. Although small loans to the poor may comprise the large majority of loans in default, the majority of the total value of loans in default often comes from medium and large loans held by the well-to-do. These trends nurture the concentration of income; even if they were eliminated, however, leverage would still favor the large borrower. Still, reducing the default problem and increasing the real rate of interest would at least substantially lessen the problem. It is concluded that current cheap credit programs should be redirected toward encouraging savings.

514,354
PB85-143071/GAR PC **A05/MF A01**
Devres, Inc., Washington, DC.
Technology and Management Needs of Small and Medium Agro-Industrial Enterprises in Kenya: Implications for an International Agro-Industrial Service Center,
D. H. Wood. 1 Jun 81, 91p AID-PN-AAM-016

Kenya's agro-industrial sector, and ways in which its technological and management needs can be met by the services of an international agro-industrial service center, are evaluated in this study. The study begins with background information on Kenya's agriculture, fisheries, and forestry sectors and continues with a description of its agro-industrial subsector. Next, the major needs of Kenya's small and medium agro-industrial firms in the areas of working capital, raw materials, management and technical assistance, marketing, information, storage, quality control/packaging, joint ventures with developed country firms, and foreign exchange are identified and prioritized.

514,355
PB85-143709/GAR PC **A03/MF A01**
RAND Corp., Santa Monica, CA.
Children and Women in Traditional and Cash Crop Agriculture: A Preliminary Cross-Section Study of Economic Development in Guatemala,
J. P. Stein. Jul 82, 36p N-1547-AID, AID-PN-AAM-019
Grant AID/OTR-G-1822

To determine the roles played by women and children in traditional and cash crop agriculture, data were gathered on 2,000 Guatemalan families, 1,000 in four rural villages and 1,000 in a larger, more modern community near Guatemala City. Results of the survey are reported in this second of two studies of rural Guatemalan families designed to support the hypothesis that economic development creates incentives to reduce population growth. Results suggest that since both children and women may be more productive in family agriculture relative to adult men than previously estimated, the shift away from agriculture reduces the incentive to population growth.

514,356
PB85-143725/GAR PC **A03/MF A01**
American Agricultural Associates, Inc., Washington, DC.
Agroindustries Investment and Trade Opportunities in Morocco,
D. M. Taylor. 15 Nov 82, 37p AID-PN-AAM-114

Morocco, because of its favorable geographic location, productive potential, and generally good investment climate, merits investigation by American agro-industrial firms as a possible investment target. This report identifies a number of specific areas of opportunity for U.S. investment and trade. First, sectors of the Moroccan economy believed to be suitable for investment - horticultural products, livestock and poultry, fisheries, and agricultural equipment supply - are examined.

514,357
PB85-144228/GAR PC **A08/MF A01**
Checchi and Co., Washington, DC.
Mauritania: Rural Assessment Manpower Surveys - Dryland Agriculture.
1980, 152p AID-PN-AAM-180
Contract AID-afr-C-1489
Prepared in cooperation with Berger (Louis) International, Inc., East Orange, NJ., and Action Programs International, Santa Monica, CA.

About 70% of Mauritania's rural population are involved in some form of dryland agriculture. The study reported here, which collected and analyzed a broad spectrum of data on dry farming in Mauritania in order to identify existing problems and evaluate develop-

ment possibilities, concludes that although most dryland production is now used for subsistence, dry farming could contribute on a medium-term basis to notably reduce Mauritania's present cereal deficits.

514,358
PB85-144624/GAR PC A08/MF A01
Checchi and Co., Washington, DC.
Mauritania: Rural Assessment and Manpower Surveys. Oasis Agriculture.
1980, 175p AID-PN-AAM-183
Contract AID/afr-C-1489
Sponsored by Berger (Louis) International, Inc., East Orange, N.J., and Action Programs International, Santa Monica, CA.

Increasing environmental pressures threaten, according to this study, to accelerate degradation of Mauritania's oasis farming subsector and to hinder realization of its potential for rationalizing and controlling exploitation and for creating new ecosystems based on use of underground water resources. Major chapters of the study provide basic information on the physical and human environment for oasis farming and on the technico-economic problems of subsector production systems. Also discussed are key production-related problems such as land tenure rights, marketing and storage, training and research, and the subsector's relation to other farming activities and its environmental effects.

514,359
PB85-145027/GAR PC A04/MF A01
Foreign Agricultural Service, Washington, DC.
Reference Tables and Graphs for World Wheat Trade.
Foreign agriculture circular.
Nov 84, 62p FG-16-84
See also PB83-245712.

The trade data presented in this publication are arranged to facilitate the analysis of year-to-year and long-term changes in world wheat trade flow patterns. The data cover the 11 years 1973/74-1983/84 (July-June) and include wheat as well as the wheat equivalent of wheat flour and products. The publication is divided into three sections. The first section shows, in graphic and tabular forms, wheat exports to major importing regions by country of origin. The second section is a graphical presentation of major wheat exporter shipments to major destinations. The last section is a collection of tables showing major exporter wheat exports by destination.

514,360
PB85-145688/GAR PC A16/MF A01
Michigan State Univ., East Lansing. Dept. of Agricultural Economics.
Research on Agricultural Development in Sub-Saharan Africa: A Critical Survey.
International development paper no. 1,
C. K. Eicher, and D. C. Baker. c1982, 351p AID-PN-AAL-692
Contract AID/ta-C-3, Grant AID/afr-G-1261
Sponsored by Woodrow Wilson International Center for Scholars, Washington, DC.

Bleak economic and agricultural growth and a long-standing decline in per capita food crop production portend discouraging prospects for development in sub-Saharan Africa, the poorest part of the world's economy. This report surveys available literature on the rural economy (both on-and off-farm) in 41 sub-Saharan countries.

514,361
PB85-146637/GAR PC A02/MF A01
Economic Research Service, Washington, DC. Natural Resource Economics Div.
U.S. Cropland, Urbanization, and Landownership Patterns.
Agricultural economic rept.,
G. C. Gustafson, and N. L. Bills. Nov 84, 23p AER-520
Color illustrations reproduced in black and white.

Most U.S. farmland is in no danger of being overrun by urban sprawl. Less than 20 percent of U.S. cropland is in metropolitan counties. Cropland in the Northeast is under more urban pressure than elsewhere because more than three-fourths of it is within or adjacent to urban counties. Ownership patterns of cropland are also different in metropolitan counties, with a higher proportion held in small parcels, by nonfarmers, and by nonfamily corporations than in rural areas. Such differences in ownership patterns may presage conversion of cropland to other uses.

2C. Agricultural Engineering

514,362
DE85000309/GAR PC A05/MF A01
ENTEC Research and Development Co., Knoxville, TN.
Farm Scale Electrical Power Production from Animal Waste. Volume I. Final Report, 30 June 1981-30 December 1983.
P. A. Carpenter. 31 Jan 84, 76p DOE/R4/10416-T2
Contract FG44-81R410416
Portions are illegible in microfiche products.

A 1 1/2 (dry) tons per day biodigester cogeneration plant has been designed and constructed. This project is part of a federal program to promote energy conservation and the use of non-conventional energy resources. The main purpose of the project is to demonstrate that a dairy farm can generate its own power and supply excess power to a local utility. Such a facility can produce significant energy savings to livestock farms and small communities by allowing them to get energy from raw animal and human waste. Also, an odorless by-product is produced that is nearly pathogenically free and has the possibility of several end uses such as: fertilizer and soil conditioner, protein-rich animal refeed, livestock bedding material, and aquatic food for fish farming. 53 references, 18 figures, 4 tables. (ERA citation 10:000835)

514,363
PB85-140218/GAR PC A04/MF A01
Utah State Univ., Logan. Dept. of Agricultural and Irrigation Engineering.
Circular Concrete Irrigation Turnout: Design and Construction. Handbook No. 1.
Water management synthesis project,
T. Trout, W. D. Kemper, and H. S. Hasan. Apr 82, 52p AID-PN-AAL-388
Contract AID/DSAN-C-0058
Prepared in cooperation with Colorado State Univ., Fort Collins. Engineering Research Center.

Improved conveyance channel water control structures are very important for bettering on-farm water management and increasing irrigation efficiency. This handbook describes the design, construction, and use of an irrigation channel turnout for rotational distribution systems in Pakistan.

514,364
PB85-141648/GAR PC A04/MF A01
International Rice Research Inst., Los Banos, Laguna (Philippines). Agricultural Engineering Dept.
Consequences of Small Farm Mechanization on Rural Employment, Incomes and Production in Selected Countries of Asia: Report of a Joint ADC-IRRI (Agricultural Development Council-International Rice Research Institute) Workshop, 14-18 September 1981.
18 Sep 81, 53p AID-PN-AAL-728
Contract AID/ta-C-1466

An A.I.D. project on the consequences of small farm mechanization on production, income, and rural employment in Asia has supported both case studies and field research on mechanization. This report summarizes a workshop conducted by the two project implementors - the International Rice Research Institute (IRRI) and the Agricultural Development Council (ADC), providing abstracts of the papers presented. The workshop's objectives were to present reports on ADC-funded case studies and some initial analyses resulting from IRRI field research. Four major topics were covered: (1) the general contributions of mechanization to development in the Asian rice-producing countries; (2) economic, technical, and social aspects of mechanization (including considerations of tractor use, postharvest operations, employment and the landless laborer, and irrigation); (3) major studies of the impact of mechanization in Central Luzon, Thailand, West Java, and South Sulawesi; and (4) industrial impacts.

514,365
PB85-141695/GAR PC A02/MF A01
International Rice Research Inst., Los Banos, Laguna (Philippines).
Technology Change in the Philippine Agricultural Machinery Industry,
K. W. Mikkelsen, and N. N. Langam. 1981, 20p AID-PN-AAL-812
Prepared in cooperation with Yale Univ., New Haven, CT. Paper presented at the Joint ADC/IRRI Workshop on the Consequences of Small Rice Farm Mechanization in Asia, Los Banos, Laguna, Philippines, September 14-18, 1981.

Because of the great variety of agricultural conditions found even within a single country, there is a strong need for locally adapted technology in agricultural machinery. This study examines the capacity of individual agricultural machinery manufacturers in the Philippines to make adaptive product improvements. A sample of 47 Philippine agricultural machinery manufacturers were interviewed. The authors found that the manufacturers had made a wide variety of product changes, showing considerable adaptation to local agricultural conditions. Each firm tended to change a product in different ways, increasing the diversity of machinery offered for sale.

514,366
PB85-143717/GAR PC A03/MF A01
Agency for International Development, Washington, DC. Office of Agriculture.
Soil Improvement, Rainfall Conservation, and Erosion Control in Developing Countries.
Technical series bulletin,
H. B. Sprague. 1984, 45p TSB-28, AID-PN-AAM-017

Agricultural production depends, among other things, on an efficient system of soil improvement, rainfall conservation, and erosion control. This bulletin discusses basic principles of sound land management that are applicable to the present situation in developing countries. Section I begins by discussing chemical aspects of soil improvement and then describes the characteristics of commercial (phosphate, nitrogen, potash, magnesium, and mixed) and natural fertilizers; proper use of the fertilizers is outlined and soil liming to reduce excessive acidity is also discussed.

514,367
PB85-144301/GAR PC A12/MF A01
International Fertilizer Development Center, Florence, AL.
Energy and Fertilizer: Policy Implications and Options for Developing Countries.
Technical bulletin,
M. S. Mudahar, and T. P. Hignett. May 82, 258p
IFDC-T-20, AID-PN-AAL-770
Grant AID/ta-G-1218

The fertilizer sector provides an important link between the energy and the agricultural sectors. This economic and technical analysis of the relationships among these three sectors: (1) estimates energy requirements for fertilizer manufacturing, packaging, transportation, and application; (2) evaluates the policy implications of energy supply and prices for fertilizer production, distribution, and prices; and (3) evaluates policy options to reduce the adverse impact of energy supply and energy prices on the fertilizer and agricultural sectors. The major emphasis is on nitrogen fertilizers.

514,368
PB85-144814/GAR PC A04/MF A01
Environmental Protection Agency, Washington, DC. Office of Pesticide Programs.
Guidance for the Reregistration of Manufacturing-Use and Certain End-Use Pesticide Products Containing Diallate.
31 Mar 83, 69p EPA/540/RS-83/027

This document contains information regarding reregistration of pesticide products containing the subject active ingredient. The document includes how to register under a registration standard, regulatory position and rationale, and summaries of data requirements and data gaps. Also included is a bibliography containing citations of all studies reviewed by EPA in arriving at the positions and conclusions contained in the standard.

514,369
PB85-146058/GAR PC A05/MF A01
New York State Coll. of Agriculture and Life Sciences, Ithaca.

Animal Traction: Guidelines for Utilization.
Cornell international agriculture mimeograph no. 81,
M. R. Goe, and R. E. McDowell. Dec 80, 92p AID-PN-AAM-876

There are conflicting views on the use of animal traction in agriculture, with some experts believing that production can only be increased through mechanization. This study propounds the viewpoint that animal traction and mechanization should be integrated in agricultural development programs. The study examines the principles of animal traction, including measuring power, the pulling of plows and wheeled implements, and line of pull. Methods of calculating the draft capacity of animals under different circumstances are also investigated, and description is given to the capabilities, in stressful, warm climates, of horses, donkeys, buffalo, oxen, cows, camels, and elephants. The draft power of yaks, yak-cattle hybrids, reindeer, llama, alpaca, dogs, elk, moose, sheep, and goats is also discussed. The draft and packing performances of different draft animals are compared, and nutrient requirements explored.

2D. Agronomy and Horticulture

514,370
DE85001412/GAR PC **A02/MF A01**
Tuskegee Inst., AL.
Effects of gamma Radiation on the Sweet Potato Weevil, Cylas Formicarius Elegantulus (Summers). Progress Report, June 1984-August 1984.
M. A. Dawes. 1984, 20p DOE/CH/10211-1
Contract FG02-84CH10211
Portions are illegible in microfiche products.

The following tests are reported: with eggs, with larvae in sweet potato roots, with larvae in sweet potato slices, with pupae in sweet potato roots, with adults, and sterility studies. Data are presented. (ERA citation 10:001256)

514,371
PB85-137354/GAR PC **A16/MF A01**
Corvallis Environmental Research Lab., OR.
Effects of SO2 on a Grassland: A Case Study in the Northern Great Plains of the United States,
W. K. Lauenroth, and E. M. Preston. Nov 84, 359p EPA/600/3-84/107
Prepared in cooperation with Colorado State Univ., Fort Collins.

This report documents a project started in 1972-73 to determine the bioenvironmental impacts of coal-fired power plants. Details of the experiments are found in the published literature and annual reports listed in the bibliography. In this text findings are generalized in chapters presenting the outline and overview of the problem, descriptions of the study sites and the SO2 exposure system, summaries and interpretation of the results of the field experiments which are then incorporated into simulation modeling exercises. Results are interpreted in the context of potential impacts of energy development in the northern Great Plains, other grasslands, and other ecosystem types.

514,372
PB85-141836/GAR PC **A04/MF A01**
Minnesota Univ., St. Paul. Economic Development Center.
Agricultural Research System of Pakistan: The Report of the Minnesota Reconnaissance Team,
C. E. Pray, V. B. Cardwell, B. G. Crabo, and P. S. Teng. Mar 82, 72p UMEDC-82-1, AID-PN-AAL-979
Contract AID/ASIA-C-1456

The agricultural research system in Pakistan, its capabilities and weaknesses, were studied by a team of four University of Minnesota faculty members during a 15-day visit in 1981. This report presents their findings. The authors first examine the contributions that agricultural research has already made to the well-being of Pakistan's people. Attention is given to crop/livestock improvement, effects on income distribution, impact by province, institutional effects, and possible future contributions.

514,373
PB85-143055/GAR PC **A18/MF A01**
International Rice Research Inst., Los Banos, Laguna (Philippines).
Drought Resistance in Crops with Emphasis on Rice.
1982, 411p ISBN-971-104-078-6, AID-PN-AAM-091
Proceedings of a symposium held at Los Banos, Philippines, May 4-8, 1981.

Water, more than any other factor, controls the development of field crops at crucial growth stages. This report contains the proceedings of a May 1981 International Rice Research Institute Symposium on crop drought resistance in which attempts were made to explain drought stress in grains across a range of environmental, agroclimatic, and genetic conditions. Special attention is given to rainfed rice.

514,374
PB85-143089/GAR PC **A04/MF A01**
Agency for International Development, Washington, DC. Office of Agriculture.
Production, Storage and Feeding of Herbaceous Forages to Support Ruminant Livestock in Developing Countries of the Tropics and Subtropics.
Technical series bulletin,
H. B. Sprague. 1980, 67p TSB-27, AID-PN-AAM-014

Developing countries urgently need to increase livestock production in order to expand meat and milk supplies and exploit animal power for agricultural development. This report provides information on the production, storage, and use of herbaceous forages for the support of ruminant livestock (cattle, buffalo, goats, and sheep) in developing tropical and subtropical countries.

514,375
PB85-143105/GAR PC **A07/MF A01**
Puerto Rico Univ., Mayaguez.
Pigeonpeas (Cajanus cajan Millisp.): A Valuable Crop of the Tropics,
J. F. Morton, R. E. Smith, M. A. Lugo-Lopez, and R. Abrams. Nov 82, 130p AID-PN-AAL-668
Grant AID/DSAN-G-0101

Current widespread interest in legumes as sources of protein and enrichers of the soil is leading to rapid increases in the production of pigeonpeas (Cajanus cajan) in the tropics, where pigeonpeas offer a vast potential over a wide range of climates and soils. This state-of-the-art report critically reviews available literature on pigeonpeas, one of the world's most important legumes, with emphasis on the crop's nitrogen economy.

514,376
PB85-143113/GAR PC **A07/MF A01**
Centro Internacional de Agricultura Tropical, Cali (Colombia).
Mejoramiento de Arroz (Rice Improvement),
P. R. Jennings, W. R. Coffman, and H. E. Kauffman. Jun 81, 147p CIAT/SER-09SR-3, ISBN-89206-06-6, AID-PN-AAM-099
Color illustrations reproduced in black and white.

As part of an international effort in rice improvement, specialists from all over the world have contributed to this volume, which provides scientists a practical manual for understanding all phases of the development of improved rice varieties. An introductory chapter on the underlying philosophy for genetic improvement research provides a background for succeeding chapters on: systems of genetic improvement; operational procedures; establishment of the objectives of genetic improvement; genetic improvement of agronomic and morphological characteristics; grain quality; genetic resistance to plagues; tolerance to unfavorable soil chemistry; adaptability to drought; and temperature tolerance.

514,377
PB85-143782/GAR PC **A05/MF A01**
New York State Coll. of Agriculture and Life Sciences, Ithaca.
Biological Nitrogen Fixation in Flooded Rice Fields.
Cornell international agriculture mimeograph no. 96,
H. S. Lowendorf. Nov 82, 81p AID-PN-AAL-834
Contract AID/csd-2834

This paper attempts to determine the amount of nitrogen that can be produced through biological fixation in flooded rice fields and examines the ability of biological nitrogen fixation to maintain or increase rice yields. First, the paper reviews three methods of measuring biological nitrogen fixation and nitrogen cycling. Next, a number of studies on nitrogen gains and losses in the rice field are summarized; exogenous and endogenous nitrogen sources, nitrogen sinks, and the nitrogen balance are examined. Experimental evidence is then cited which indicates that farmers can manipulate nitrogen fixers to significantly raise rice yields.

2F. Forestry

514,378
DE85000681/GAR PC **A04/MF A01**
FORECO, Rumney, NH.
Assessment of Biomass Harvesting on Small Woodlots in New Hampshire.
R. J. Berti. Jun 84, 60p DOE/NBM-5000681

A 400 acre study of biomass harvesting was conducted on twenty-one woodlots from 4 to 39 acres in size. A mix of equipment was evaluated in different terrain and stand conditions. Landowner and silvicultural objectives varied; most woodlots required only a partial, or selective harvest although three clearcuts were included for comparison. Silvicultural objectives were met on all sites, and residual damage was less than with traditional harvesting. Equipment, job layout and supervision were examined in detail. Average yields from thinnings were 35 tons per acre. From the data obtained estimates of the available biomass resource in the southern two-thirds of the state were made. The project demonstrated that mechanized, biomass harvesting on small woodlots, is both economically and silviculturally feasible and desirable. 27 references, 10 tables. (ERA citation 10:002081)

514,379
DE85000682/GAR PC **A03/MF A01**
Virginia Polytechnic Inst. ad State Univ., Blacksburg. School of Forestry.
Continued Development of the Residue Baler. Final Report.
W. B. Stuart. 1984, 30p DOE/NBM-5000682
Portions are illegible in microfiche products. Original copy available until stock is exhausted.

The baling concept discussed in this report has evolved from work started in 1975. The objective of this activity was to develop a method for transporting entire above ground portions of both pine and hardwood stems to a mill or centralized processing point in a form that was compatible with truck, trailer, rail and barge hauls and with sufficient bulk density to optimize load sizes on the various carriers while expending a minimum amount of capital and energy in the woods operations. The year's work resulted in the baling concept and a prototype baler being tested under a wide variety of field conditions material types and operating scenarios. The work in the Pacific Northwest demonstrated that baling offers a means of preparing forest residues for transport which results in a near maximum solid wood content in a load. The reworking of the hydraulic circuits significantly reduced the cycle time on the prototype without increasing the power requirements. The installation of the wire feed assembly moved the development of an automatic banding and tying system one step closer. Both sets of field trials also pointed out that a true field demonstration of the commercial ability of the baline concept will have to await the construction of a second generation prototype producing a larger bale and designed to accept several different infeed types. 7 figures, 3 tables. (ERA citation 10:002082)

514,380
N85-13663/8/GAR PC **A05/MF A01**
Stanford Univ., CA.
NASA/ASEE Summer Faculty Fellowship Program, 1984.
Final Report.
Sep 84, 90p NAS 1.26:174138, NASA-CR-174138
Contract NGT-05-020-412

The assessment of forest productivity and associated nitrogen flux in a number of conifer ecosystems is described. As a base line study of acid precipitation in the Sierra Nevada, involved is the extraction and integration of a number of data planes describing the terrain, soils, lithology, vegetation cover and structure, and microclimate of the region. The development of automated techniques to extract topographic networks (stream canyons and ridge lines) for use as a landscrape skeleton to organize and integrate data sets into an efficient

geographical information system is examined. The software is written in both FORTRAN and C, and is portable to a number of different computer environments with minimal modification.

514,381
PB85-156917/GAR PC A20/MF A01
Forest Products Lab., Madison, WI.
Tropical Timbers of the World,
M. Chudnoff. Sep 84, 463p AGRICULTURE HANDBOOK-607
See also AD-A086073.

Over the past two decades U.S. lumber imports from the tropics have increased fourfold. Plywood trade, mostly from Asian sources, has soared fortyfold and now equals our domestic production. Log imports, though, have decreased drastically from about 100 million board feet (log scale) in the 1950's to 30 million currently. Much of the world timber trade now is in the form of processed material. A wide array of tropical wood species and species groupings are now available to U.S. processors. Many are already well known on the European markets. This surge in supplies from overseas includes softwoods, hardwoods, decorative species, and utility woods. An extensive body of foreign literature describes the properties of tropical woods. The most recent comprehensive document, 'Properties of Imported Tropical Woods,' contained a description of about 100 tropical genera. Because of the ever-increasing demand for reference material, the authors have prepared this more extensive data source. Parts I--Tropical America, II--Africa, and III--Southeast Asia and Oceania contain concise descriptions of tree and timber characteristics for about 370 tropical species or generic groupings. The actual number of botanical entities, however, is many more. Almost all the information was compiled from world literature.

3. ASTRONOMY AND ASTROPHYSICS

3A. Astronomy

514,382
N85-13491/4/GAR PC A02/MF A01
National Aeronautics and Space Administration, Greenbelt, MD. Goddard Space Flight Center.
Documentation for the Machine-Readable Version of the MK Classification Extension Catalogue Morris-Kennedy (1983).
W. H. Warren. Oct 83, 16p NAS 1.15:87372, NASA-TM-87372

Detailed descriptions of the contents and formats of the data and reference files of the machine-readable catalog are provided. The catalog contains MK classifications published in the literature since the issuance of the La Plata catalog of C. Jaschek et al., (1964). The bibliographical references are also given.

514,383
N85-13492/2/GAR PC A02/MF A01
National Aeronautics and Space Administration, Greenbelt, MD. Goddard Space Flight Center.
Documentation for the Machine-Readable Version of the Perth 75: A Catalogue of Positions of 2589 FK4 and Fk4s Stars (Nikoloff and Hog 1982).
W. H. Warren. Feb 84, 14p NAS 1.15:87376, NSSDC/WDC-A-R/S-84-03, NASA-TM-87376

Detailed descriptions of the data and format of the machine-readable astronomical catalog are given. The machine version is identical in data content to the published edition, but minor modifications in the data format were made in order to effect uniformity with machine versions of other astronomical catalogs. Stellar motions and positions at epoch and equinox 1950.0 are reported.

514,384
N85-13493/0/GAR PC A02/MF A01
National Aeronautics and Space Administration, Greenbelt, MD. Goddard Space Flight Center.
Documentation for the Machine-Readable Version of the AGK3 Star Catalogue of Positions and Proper Motions North of -2 Deg .5 Declination (Dieckvoss and Collaborators 1975).
W. H. Warren. May 84, 20p NAS 1.15:87378, NSSDC/WDC-A-R/S-84-06, NASA-TM-87378

A detailed description of the machine-readable astronomical catalog as it is currently being distributed from the Astronomical Data Center is given. Stellar motions and positions are listed herein in tabular form.

3B. Astrophysics

514,385
AD-A149 018/4/GAR PC A03/MF A01
Maryland Univ., College Park. Dept. of Physics and Astronomy.
Solar Radio Bursts, Proton Events and Geomagnetic Activity,
S. S. Degaonkar. Aug 84, 43p AP-84-056, SCIENTIFIC-1, AFGL-TR-84-0259
Contract F19628-83-K-0004

The relationships between type II, type IV, microwave bursts and geomagnetic activity have been studied using data from various observatories compiled in the Solar-Geophysical Data over the period 1968-1982. It is found that type II bursts follow the trend of solar activity in general, more bursts occurring during periods of high solar activity. A similar trend is also seen with type IV bursts but their occurrence frequency is smaller than that of type II bursts. Superposed epoch analysis of geomagnetic activity index Ap before and after the events shows no dependence on type II bursts but the relationship with Ap improves following type II/IV bursts and a still better improvement is observed with type II bursts associated with moving type IV events. The position of type II burst on the solar disk does not seem to affect the Ap values significantly. Similar analysis carried out on the days of occurrence of solar proton events during 1970-1979 showed that an enhancement in Ap index on the second/third day is clearly seen in some years but not in all. But on the average, Ap shows significant increase if we consider longer periods i.e. 5 to 10 years.

514,386
N85-13694/3/GAR PC A05/MF A01
Lunar and Planetary Inst., Houston, TX.
Activities at the Lunar and Planetary Institute.
Semiannual Status Report, 1 Jan. - 30 Jun. 1984.
30 Jun 84, 87p NAS 1.26:174069, NASA-CR-174069
Contract NASW-3389

No abstract available.

514,387
N85-13699/2/GAR PC A06/MF A01
Smithsonian Astrophysical Observatory, Cambridge, MA.
Normal Incidence, High Resolution X-Ray Telescope for Solar Coronal Observations.
Semiannual Progress Report, 1 May - 31 Oct. 1984.
L. Golub. Nov 84, 101p NAS 1.26:174145, SAPR-4, NASA-CR-174145
Contract NAGW-397

Efforts directed toward the completion of an X-ray telescope assembly design, the procurement of major components, and the coordination of optical fabrication and X-ray multilayer testing are reported.

514,388
N85-13700/8/GAR PC A02/MF A01
National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
Detection of Submillimeter Polarization in the Orion Nebula.
R. H. Hildebrand, M. Dragovan, and G. Novak. Oct 84, 20p NAS 1.15:86013, REPT-85008, NASA-TM-86013
Grant NSG-2057

Linear polarization of the submillimeter (270 micron) continuum radiation from two regions of Orion was observed: one centered on the Kleinmann-Low Nebula and one centered on the 400 micron peak 1.5' south of the nebula. The polarizations measured for these regions are P = (1.7 +/-0.4)% at phi = 23 deg +/-7 deg and P=(1.7 +/- 0.5)% at phi = 27 deg +/- 7 deg respectively. A 2(sigma) upper limit, P or = 1.6%, was found for the nebular W3(OH). The position angle at KL is orthogonal to that measured at 11 microns by Dyck and Beichman and at 11 and 20 microns by Knacke and Capps. The far-IR values for KL reported by Gull et. al. (approx 2%) and by Cudlip et al. (1 to 2% level) are consistent with the submillimeter results.

514,389
N85-13701/6/GAR PC A02/MF A01
National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
Far-Infrared Photometry of Compact Extragalactic Sources: OJ 187 and BL Lac.
P. M. Harvey, M. Joy, D. F. Lester, and B. A. Wilking. Oct 84, 14p NAS 1.15:86022, REPT-85016, NASA-TM-86022
Contract NAG2-67

The 50 and 100 micron emissions of OJ 287 were detected and upper limits for BL Lac were obtained. These first measurements of two BL Lac objects in the far-infrared show them to be similar to the few quasars previously observed in the far-infrared. In particular, there is no evidence for significant dust emission, and the lambda approximately 100 micron flux density fits on a smooth line joining the near-infrared and millimeter continuum fluxes. The implications of the results for models of the sources are discussed briefly.

514,390
N85-13702/4/GAR PC A10/MF A01
Cornell Univ., Ithaca, NY.
Far-Infrared Line Emission from the Galaxy.
Ph.D. Thesis.
G. J. Stacey. Jan 85, 225p NAS 1.26:174166, CRSR-823, NASA-CR-174166
Grant NSG-2347

The diffuse 157.74 micron (CII) emission from the Galaxy was sampled at several galactic longitudes near the galactic plane including complete scan across the plane at (II) = 2.16 deg and (II) = 7.28 deg. The observed (CII) emission profiles follow closely the nearby (12)CO (J=1to0) emission profiles. The (CII) emission probably arises in neutral photodissociation regions near the edges of giant molecular clouds (GMC's). These regions have densities of approximately 350 cm(-3) and temperatures of approximately 300 K, and amount to 4x10(8) solar mass of hydrogen in the inner Galaxy. The total 157.74 micron luminosity of the Galaxy is estimated to be 6x10(7) solar luminosity. Estimates were also made of the galactic emission in other far-infrared (FIR) cooling lines. The (CII) line was found to be the dominant FIR emission line from the galaxy and the primary coolant for the warm neutral gas near the galactic plane. Other cooling lines predicted to be prominent in the galactic spectrum are discussed. The 145.53 micron (OI) emission line from the Orion nebula was also measured.

514,391
N85-13703/2/GAR PC A02/MF A01
Joint Inst. for Lab. Astrophysics, Boulder, CO.
Outer Atmospheres of Giant and Supergiant Stars.
A. Brown. 1984, 14p NAS 1.26:174165, NASA-CR-174165
Contract NAG5-82

The properties of the chromospheres, transition regions and coronas of cool evolved stars are reviewed based primarily on recent ultraviolet and X-ray studies. Determinations of mass loss rates using new observational techniques in the ultraviolet and radio spectral regions are discussed and observations indicating general atmospheric motions are considered. The techniques available for the quantitative modeling of these atmospheres are outlined and recent results discussed. Finally, the current rudimentary understanding

of the evolution of these outer atmospheres and its causes are considered.

514,392
N85-13704/0/GAR PC **A02/MF A01**
Joint Inst. for Lab. Astrophysics, Boulder, CO.
RS CV sub n Binary Systems.
J. L. Linsky. 1984, 15p NAS 1.26:174164, NASA-CR-174164
Contracts NAG5-82, NGL-06-003-057

An attempt is made to place in context the vast amount of data obtained as a result of X-ray, ultraviolet, optical, and microwave observations of RS CVn and similar spectroscopic binary systems. Emphasis is on the RS CVn systems and their long period analogs. The following questions are considered: (1) are the original defining characteristics still valid and still adequate, (2) what is the evidence for discrete active regions, (3) have any meaningful physical properties for the atmospheres of RS CVn systems been derived, (4) what do the flare observations tell about magnetic fields in RS CVn systems, (5) is there evidence for systematic trends in RS CVn systems with spectral type.

514,393
N85-13705/7/GAR PC **A02/MF A01**
Harvard Coll. Observatory, Cambridge, MA.
Absolute Transition Probabilities of Lines in the Spectra of Astrophysical Atoms, Molecules, and Ions.
Semiannual Status Report.
W. H. Parkinson, P. L. Smith, and K. Yoshino. 10 Dec 84, 18p NAS 1.26:174141, SASR-15, NASA-CR-174141
Grant NSG-7304

Progress in the investigation of absolute transition probabilities (A-values or F values) for ultraviolet lines is reported. A radio frequency ion trap was used for measurement of transition probabilities for intersystem lines seen in astronomical spectra. The intersystem line at 2670 A in Al II, which is seen in pre-main sequence stars and symbiotic stars, was studied.

514,394
N85-13707/3/GAR PC **A02/MF A01**
Rome Univ. (Italy). Ist. di Fisica.
Search for the Radiative Decay of a Cosmic Relic Particle with IUE.
F. Bochicchio, G. Auriemma, A. Frenkel, and F. Massa. 5 Jul 84, 3p PREPRINT-410
Submitted for Publication. Presented at 4TH European Iue Conf.

The UV background at the absolute value of or = 45 deg was determined using low resolution large aperture IUE spectra. Apart from the identification of hot interstellar gas emission lines, a component of the continuum with a power law distribution was fitted to the spectrum, as expected from the decay of a primordial relic light particle. From this fit a candidate mass for the neutrino of 14.8 + or - 0.1 eV and a lifetime of 10 to the 16th power yr are obtained. The probability that statistical fluctuations could mimic this signal is estimated to be 2%. Implications of the results in terms of cosmology and particle physics are discussed.

514,395
N85-13708/1/GAR PC **A02/MF A01**
California Inst. of Tech., Pasadena.
Mars Polar Volatiles: Topographic and Geologic Setting.
Status Report.
B. Murray, L. Soderblom, and K. Herkenhoff. Oct 84, 2p NAS 1.26:174089, NASA-CR-174089
Contract NAGW-549

Progress on a project to elucidate the geological and topographic setting of the Martian polar volatiles is reported. The following accomplishments are enumerated: (1) all of the Mariner 9 imaging data sets available through JPL were acquired and copied; (2) Mariner 9 imagery was investigated in terms of the accuracy of the imaging footprints, dark current, and residual image; (3) the transfer functions of both vidicons were investigated; and (4) the magnitude of the atmospheric scattering was examined.

514,396
N85-13709/9/GAR PC **A04/MF A01**
Lunar and Planetary Inst., Houston, TX.
Conference on the Origin of the Moon.
1984, 64p NAS 1.26:174068, LPI-CONTRIB-540, NASA-CR-174068
Contract NASW-3389
Conf. Held in Kona, Hawaii, 13-16 Oct. 1984; Sponsored in Cooperation with the American Astronomcal Society.

No abstract available.

514,397
N85-13758/6/GAR PC **A03/MF A01**
Rice Univ., Houston, TX.
Laboratory Studies of Atomic Collision Processes of Importance in Planetary Atmospheres.
Semiannual Status Report.
R. F. Stebbings, and K. Smith. 31 Aug 84, 27p NAS 1.26:174142, NASA-CR-174142
Grant NSG-7386

Progress in the following research supported under NSG 7386 is reported: (1) measurement of differential cross sections for atomic and molecular collisions relevant to analysis and modeling of data from Pioneer 11, Pioneer 12, Voyager 1, and Voyager 2; (2) analysis of measured differential cross section results to provide scattering data in forms that are easy to apply to atmospheric modeling work; (3) analysis of the data to give basic information on the molecular potentials involved in the scattering process; and (4) development and initial use of apparatus to study dissociative processes in neutral molecules.

514,398
N85-13759/4/GAR PC **A04/MF A01**
Atmospheric and Environmental Research, Inc., Cambridge, MA.
Outer Satellite Atmospheres: Their Nature and Planetary Interactions.
Annual Report, 1 Jun. 1983 - 31 Jul. 1984.
W. H. Smyth, and M. R. Combi. Nov 84, 56p NAS 1.26:174146, NASA-CR-174146
Contract NASW-3387

Significant insights regarding the nature and interactions of Io and the planetary magnetosphere were gained through modeling studies of the spatial morphology and brightness of the Io sodium cloud. East-west intensity asymmetries in Region A are consistent with an east-west electric field and the offset of the magnetic and planetary-spin axes. East-west orbital asymmetries and the absolute brightness of Region B suggest a low-velocity (3 km/sec) satellite source of 1 to 2 x 10(26) sodium atoms/sec. The time-varying spatial structure of the sodium directional features in near Region C provides direct evidence for a magnetospheric-wind-driven escape mechanism with a high-velocity (20 km/sec) source of 1 x 10(26) atoms/sec and a flux distribution enhanced at the equator relative to the poles. A model for the Io potassium cloud is presented and analysis of data suggests a low velocity source rate of 5 x 10(24) atoms/sec. To understand the role of Titan and non-Titan sources for H atoms in the Saturn system, the lifetime of hydrogen in the planetary magnetosphere was incorporated into the earlier Titan torus model of Smyth (1981) and its expected impact discussed. A particle trajectory model for cometary hydrogen is presented and applied to the Lyman-alpha distribution of Comet Kohoutek (1973XII).

514,399
N85-13760/2/GAR PC **A04/MF A01**
Stanford Univ., CA.
Magnetohydrodynamic and Gasdynamic Theories for Planetary Bow Waves.
J. R. Spreiter, and S. S. Stahara. 1983, 71p NAS 1.26:174135, NASA-CR-174135
Contract NAGW-2781

A bow wave was previously observed in the solar wind upstream of each of the first six planets. The observed properties of these bow waves and the associated plasma flows are outlined, and those features identified that can be described by a continuum magnetohydrodynamic flow theory. An account of the fundamental concepts and current status of the magnetohydrodynamic and gas dynamic theories for solar wind flow past planetary bodies is provided. This includes a critical examination of: (1) the fundamental assumptions of the theories; (2) the various simplifying approximations introduced to obtain tractable mathematical problems; (3) the limitations they impose on the results; and (4) the relationship between the results of the simpler gas dynamic-frozen field theory and the more accurate but less completely worked out magnetohydrodynamic theory. Representative results of the various theories are presented and compared.

514,400
N85-13761/0/GAR PC **A03/MF A01**
National Aeronautics and Space Administration, Greenbelt, MD. Goddard Space Flight Center.
Interplanetary Radio Storms. 2: Emission Levels and Solar Wind Speed in the Range 0.05-0.8 AU.
J. L. Bougeret, J. Fainberg, and R. G. Stone. Dec 82, 34p NAS 1.15:84946, NASA-TM-84946

Storms of interplanetary type III radio bursts (IP storms) are commonly observed in the interplanetry medium by the ISEE-3 radio instrument. This instrument has the capability of accurately determining the arrival direction of the radio emission. At each observing frequency, the storm radio sources are tracked as they cross the line-of-sight to the Sun. Usng a simple model, the emission levels are determined at a number of radio frequencies for four separate storms. The IP storm radiation is found to occur in regions of enhanced density at levels of 0.05 to 0.8 AU. The density in these enhancements falls off faster than R(-2). The solar wind speed in the storm region is also measured. The analysis is consistent with steady conditions in the storm region during a few days around the central meridian passage of the storm. The comparison with average in situ density measurements compiled from the HELIOS 1-2 observations favors type III storm burst radio emission at the harmonic of the local plasma frequency.

514,401
N85-13762/8/GAR PC **A02/MF A01**
Smithsonian Astrophysical Observatory, Cambridge, MA.
Time Dependent Effects at the Foot of the Chromosphere.
Final Report.
W. Kalkofen. Nov 84, 4p NAS 1.26:174143, NASA-CR-174143
Contract NAGW-253

A dynamical model was proposed which is in agreement with the observations that suggest the solar chromosphere is heated preferentially in magnetic regions. The dynamical model requires an energy flux that is large enough to lead to amplitudes for which the apparent temperatures match the empirical line temperatures in the UTV lines. Consistency with the observations of chromospheric emission then requires that the emission take place not uniformly over the solar surface but in smaller spatial regions.

514,402
PB85-147692/GAR PC **A05/MF A01**
National Geophysical Data Center, Boulder, CO.
Solar-Geophysical Data Number 483, November 1984. Part 1 (Prompt Reports). Data for October 1984, September 1984 and Late Data.
H. E. Coffey. Nov 84, 99p SGD-483-PT-1
See also PB85-147700 and PB85-139145. Library of Congress catalog card no. 79-640375.

Contents: Detailed index for 1984; Data for October 1984--(IUWDS alert periods (Advance and Worldwide); Solar activity indices; Solar flares; Solar radio emission; Inferred interplanetary magnetic field polarity graph; Mean solar magnetic field); Data for September 1984--(Solar active regions; Sudden ionospheric disturbances; Solar radio spectral observations; Cosmic ray measurements by neutron monitor; Geomagnetic indices; Radio propagation indices); Late data--(Culgoora solar radio spectral data August 1984, Geomagnetic sudden commencements August 1984, Cosmic rays Deep River/alert July and August 1984, Big Bear calcium plage daily photos/calcium plage index April-May 1983, Vostok corrected inferred interplanetary magnetic field polarity 1982-83).

514,403
PB85-147700/GAR PC **A06/MF A01**
National Geophysical Data Center, Boulder, CO.
Solar-Geophysical Data Number 483, November 1984. Part 2 (Comprehensive Reports). Data for May 1984, December 1981 and Miscellanea.
H. E. Coffey. Nov 84, 112p SGD-483-PT-2
See also PB85-147692 and PB85-139152.

Contents: Detailed index for 1984; Data for May 1984--(Meudon carte synoptique; Solar radio bursts at fixed frequencies; Interplanetary solar particles and plasma; Solar x-ray radiation from GOES satellite; Mass ejec-

tions from the sun; Active prominences and filaments); Data for December 1981--(Solar flares December 1981; Number of flares August 1966-December 1981); Miscellaneous data--Solar wind (IMP 8) October 1983-April 1984.

4.

ATMOSPHERIC SCIENCES

4A. Atmospheric Physics

514,404

AD-A149 029/1/GAR PC **A02/MF A01**
University Coll., London (England). Dept. of Physics and Astronomy.
Thermospheric Energy Flux of the Semidiurnal Tide,
G. V. Groves. 1983, 5p AFOSR-TR-84-1136
Grant AFOSR-82-0052
Pub. in Planet Space Science, v31 n10 p1183-1186 1983.

No abstract available.

514,405

N85-12918/7/GAR PC **A03/MF A01**
Iowa Univ., Iowa City.
Reduction and Analysis of Data from the Plasma Wave Instruments on the IMP-6 and IMP-8 Spacecraft.
Final Report.
D. A. Gurnett, and R. R. Anderson. Jan 83, 28p NAS 1.26:175127, NASA-CR-175127
Contract NAS5-26125

The primary data reduction effort during the reporting period was to process summary plots of the IMP 8 plasma wave data and to submit these data to the National Space Science Data Center. Features of the electrostatic noise are compared with simultaneous observations of the magnetic field, plasma and energetic electrons. Spectral characteristics of the noise and the results of this comparison both suggest that in its high frequency part at least the noise does not belong to normal modes of plasma waves but represents either quasi-thermal noise in the non-Maxwellian plasma or artificial noise generated by spacecraft interaction with the medium.

514,406

N85-13308/0/GAR PC **A23/MF A01**
Observatorio del Ebro, Roquetas (Spain).
Contribuciones Cientificas Para Conmemorar El 75 Aniversario Del Observatorio Del Ebro (Scientific Contributions in Commemoration of Ebro Observatory's 75TH Anniversary).
J. O. Cardus. 1983, 548p ISBN-84-00-05380-X
Partly in English, Spanish and French. Original contains color illustrations.

No abstract available.

514,407

N85-13409/6/GAR PC **A05/MF A01**
National Aeronautics and Space Administration, Huntsville, AL. George C. Marshall Space Flight Center.
Global Matrix of Thermospheric Density Values for Selected Solar/Geomagnetic Conditions and Spacecraft Orbital Attitudes.
D. L. Johnson. Dec 84, 92p NAS 1.15:86478, M-471, NASA-TM-86478

Presented are selected thermospheric/exospheric global mean and extreme density values computed between 130 and 1100 km altitude. These values were generated from the MSFC/J70 reference orbital atmospheric model using different input conditions of solar flux and geomagnetic index, ranging from low to peak. Typical magnitudes of day-night density changes are presented, as an example, for use in space vehicle orbital analyses.

514,408

PB85-144137/GAR PC **A02/MF A01**
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Sciences Research Lab.
Cumulus Cloud Venting of Mixed Layer Ozone,
J. K. S. Ching, S. T. Shipley, E. V. Browell, and D. A. Brewer. Jan 85, 9p EPA/600/D-84/299
Prepared in cooperation with National Aeronautics and Space Administration, Hampton, VA. Langley Research Center and Systems and Applied Sciences Corp., Hampton, VA.

Observations are presented which substantiate the hypothesis that significant vertical exchange of ozone and aerosols (and possibly other compounds) occurs between the mixed layer and the free troposphere during cumulus cloud convective activity. The experiments conducted in July 1981, utilized the airborne UV-DIAL (Ultra-Violet Differential Absorption Lidar) system developed by NASA. This system provides simultaneous range resolved ozone concentration and aerosol back scatter profiles with high spatial resolution. Data were obtained during the afternoon along 80 mi East to West and South to North intersecting transects over North Carolina when cumulus clouds were most active, although nonuniformly distributed. Evening transects were obtained in the downwind area where the air mass had been advected. Space-height analyses for the evening flight show the cloud 'debris' as patterns of ozone typically in excess of the ambient free tropospheric background. This ozone excess was approximately the value of the concentration difference between the mixed layer and free troposphere determined from independent vertical soundings made by another aircraft in the afternoon.

514,409

PB85-855104/GAR PC **N01/MF N01**
National Technical Information Service, Springfield, VA.
Atmospheric Effects on Laser Beams. 1975-February 1985 (Citations from the NTIS Data Base).
Rept. for 1975-Feb 85.
Feb 85, 218p
Supersedes PB83-803734.

This bibliography contains citations concerning laser beam transmission characteristics in the atmosphere. Topics include the effects of turbulence, aerosols, and atmospheric composition. The effects on optical radar, communications, and infrared devices are discussed. Some attention is given to the use of laser devices for the measurement of atmospheric parameters. Computerized simulations used to predict attenuation are included. (This updated bibliography contains 244 citations, 19 of which are new entries to the previous edition.)

4B. Meteorology

514,410

AD-A148 894/9/GAR PC **A04/MF A01**
Air Weather Service, Scott AFB, IL.
Equations and Algorithms for Meteorological Applications in Air Weather Service.
Technical rept.,
G. F. Duffield, and G. D. Nastrom. 11 Jul 84, 69p AWS/TR-83/001, SBI-AD-E850 737

This document lists equations of algorithms used for computing common meteorological and geophysical variables. It should serve as a handy reference for Base Weather Station computer programmers and thus promote standardization and minimize time consuming literature researches by them. The equations and algorithms are classified into three groups: kinematic properties, thermodynamic properties, and gridded or contoured data fields.

514,411

AD-A148 992/1/GAR PC **A03/MF A01**
Naval Environmental Prediction Research Facility, Monterey, CA.
Processing of Global Area Coverage (GAC) Data of the TIROS-N/NOAA Series Polar Orbiters.
Technical rept.,
V. Treis. Oct 84, 31p Rept no. NEPRF-TR-84-01

Global Area Coverage (GAC) data is stored data of the AVHRR instrument. The original HRPT resolution of 1.1 km is reduced to about 3.3 by 4.0 km. There are 120 scans per minute with 409 pixels each. The raw data are available from the National Climatic Data Center as tape copies that generally contain calibration information. In order to process the data on the SPADS, the data must be unpacked and written to a disk file in a specified format. Then, the image can be transformed in either Mercator or Polar Stereographic Projection, and the geographical background may be added.

514,412

DE85001483/GAR PC **A03/MF A01**
Michigan Univ., Ann Arbor.
Program for Solar Energy Meteorological Research and Training, Region VI. Final Report.
E. Ryznar, and D. J. Portman. Aug 83, 40p DOE/ET/20164-T1
Contract FG05-77ET20164
Portions are illegible in microfiche products.

Results of work on the Program for Solar Energy Meteorological Research and Training, Region VI, for the period 1 October 1977 through 30 June 1982 are summarized. Activities involving solar and meteorological measurements and data processing, education and training and communications and consultation are described. (ERA citation 10:002072)

514,413

DE85001845/GAR PC **A22/MF A01**
National Research Council, Washington, DC.
Changing Climate. Report of the Carbon Dioxide Assessment Committee.
1983, 518p DOE/ER/60028-T1
Contract AI01-81ER60028

The report presents a comprehensive assessment of the CO sub 2 issue. Included in the assessment are: identification of risks and prospective changes; estimation of probabilities of their occurrence; linkage of such events with various environmental and social consequences, and evaluation of the risks by comparison with costs, with other risks, with benefits, with alternative ways of reducing risks, or with risks of substitute activities. CO sub 2 emissions and concentrations are projected; possible climatic changes are assessed, implications of increasing CO sub 2 and climatic change for agriculture, water, sea level, and other selected areas are examined. (ERA citation 10:002433)

514,414

N85-13421/1/GAR PC **A05/MF A01**
Instituto de Pesquisas Espaciais, Sao Paulo (Brazil).
Fontes de Calor Nos Tropicos E Escoamentos Anoma Los de Larga Escala Associadas COM Anomalias de Precipitacao No Nordeste Do Brasil (Heat Sources in the Tropics and Large Scale Flow Anomalies Associated with Precipitation Anomalies in Northeast Brazil).
M.S. Thesis.
P. Nobre. Jul 84, 98p INPE-3211-TDL/175
In Portuguese; English Summary.

An analysis in the monthly departure of the relative vorticity field over the globe and monthly departures of the sea surface temperature (SST) in the Tropical Atlantic Ocean is performed for years of droughts and floods over northeast Brazil, in the period from 1963 to 1980. Planetary scale wavelike patterns were observed in the relative vorticity field, similar to those found in previous theoretical and observational studies. Of major interest, is the phase coherence of the wavelike patterns of circulation anomalies over the Northern Hemisphere and the precipitation regime over northeast Brazil. Such phase coherence, in addition to the occorrence of SST anomalies in the Tropical Atlantic Ocean (with warmer waters in the north and colder in the south of the equator for drought years, and the reverse for flood years), indicates that the existence of global scale wavelike patterns in relative vorticity field, as well as the variability of the precipitation regime over northeast Brazil are, respectively, the remote and local response of the atmosphere to a tropical thermal forcing.

514,415
N85-13422/9/GAR PC **A02/MF A01**
Oregon State Univ., Corvallis. Dept. of Atmospheric Sciences.
Alternative to Reduction of Surface Pressure to Sea Level.
J. W. Deardorff. 1982, 12p NAS 1.26:174174, NASA-CR-174174
Contract NAG5-51

The pitfalls of the present method of reducing surface pressure to sea level are reviewed, and an alternative, adjusted pressure, P, is proposed. P is obtained from solution of a Poisson equation over a continental region, using the simplest boundary condition along the perimeter or coastline where P equals the sea level pressure. The use of P would avoid the empiricisms and disadvantages of pressure reduction to sea level, and would produce surface pressure charts which depict the true geostrophic wind at the surface.

514,416
N85-13424/5/GAR PC **A02/MF A01**
Cooperative Inst. for Research in the Atmosphere, Fort Collins, CO.
Investigations of Severe/Tornadic Thunderstorm Development and Evolution Based on Satellite and AVE/Sesame/VAS Data.
Final Technical Report.
T. H. Vonderhaar, and J. F. W. Purdon. Dec 84, 9p NAS 1.26:174154, NASA-CR-174154
Contract NAGW-504
Sponsored in Part by Colorado State Univ.

The use of rapid scan satellite imagery to investigate the local environment of severe thunderstorms is discussed. Mesoscale cloud tracking and vertical wind shear as it affects thunderstorm relative flow are mentioned. The role of pre-existing low level cloud cover in the outbreak of tornadoes was investigated. Applying visible atmospheric sounding imagery to mesoscale phenomena is also addressed.

514,417
N85-13434/4/GAR PC **A04/MF A01**
Royal Netherlands Meteorological Inst., De Bilt.
Inzameling en Opslag van Cabauwmetingen: Een Systeemvoorstel (Acquisition and Storage of Cabauw Measurements: A System Proposal).
A. C. M. Beljaars, G. D. G. Folkers, R. A. Hoenson, and A. Unlandt. Jan 84, 57p KNMI-TR-48
Text in Dutch.

The future measuring program of the Cabauw mast was prepared. The program has three purposes: the measurements are processed to meteorological reports; they are stored for research and climatological data; and the program is a background for experiments taking place at Cabauw. The first two purposes have a strongly operational character and require a system with a high availability. A global proposal is made for data preprocessing in Cabauw, data transport to the Royal Dutch Meteorological Institute (KNMI) at De Bilt, and data storage in De Bilt. Each of these subjects are presented in separate chapters. The proposal is based on a configuration whereby the data reduction takes place in Cabauw, the reduced data in bulletin-form are sent via a fixed line to the datacomprocessor (PDP11) at De Bilt, and the archiving is made on the B6800 computer.

514,418
N85-13435/1/GAR PC **A03/MF A01**
Royal Netherlands Meteorological Inst., De Bilt.
Operationele Numerieke Voorspellingen: Overzicht en Verifikatie over de Periode 1978-1983 (Operational Numerical Forecasts: Survey and Verification over the Period 1978-1983).
H. Timmerman, L. C. Heijboer, and A. Vanderhoek. 1984, 29p KNMI-TR-49
In Dutch; English Summary.

The numerical operational model of the Royal Dutch Meteorological Institute (KNMI) in the years 1978-1983 is surveyed. The verification deals with the pressure and the pressure gradient which are very important components in the computation of the wind. Observed winds at the light vessel Goeree were compared with computed winds of the KNMI-model. Tidal observations of Hoek van Holland were verified against computed values of the KNMI storm surge model. Some important conclusions can be drawn. For the first 12 hours forecast - with respect to the pressure gradient - the difference between the KNMI filtered model and the advanced models based on primitive equations is small. For a forecast period up to 24 hours, there are no significant differences between a simple two-parameter filtered model and a filtered four-layer model. With respect to the tidal computations the relatively large difference between observed tidal heights and tidal heights compared by means of analyzed pressure fields is striking. Apparently this difference provides, on the average, the most important contribution to the difference between the tidal observations and the computed tidal values, at least for the first 12 hours of forecast.

514,419
PB85-144350/GAR PC **A04/MF A01**
Washington Univ., Seattle. Dept. of Atmospheric Sciences.
Studies of the Mechanisms and Rates with Which Nitrogen Species are Incorporated into Cloud Water and Precipitation.
Annual rept.,
D. A. Hegg, and P. V. Hobbs. Oct 84, 58p CRC/APRAC/CAPA-21-80-04

In view of the current lack of understanding of the processes involved in the production of acid rain, the Cloud and Aerosol Research Group of the University of Washington is undertaking a study for the Coordinating Research Council of the role of clouds in the incorporation of nitric acid into rain. The principal objective of the study is to determine which of several possible mechanisms dominates the incorporation of nitrate into cloud water. In addition, a number of ancillary objectives (e.g., comparisons of the sources of nitrate and sulfate in cloud water) are being addressed. The data that have been used for preliminary assessments during the first year of the project can be divided into four basic sets. The first of these was acquired prior to the commencement of this study; the second set was acquired during the course of developing both instrumentation and a sampling strategy appropriate for the specific needs of the CRC study; the third set is comprised of cases acquired after sampling strategy and instrumentation had reached maturity (since it contains the best data to date, it receives special emphasis in this report); and the fourth set presents some data from an air-mass modification study.

514,420
PB85-148799/GAR PC **A02/MF A01**
National Weather Service, Washington, DC. Climate Analysis Center.
Monthly and Seasonal Weather Outlook for January 1985, Volume 39, Number 1, December 29, 1984.
29 Dec 84, 10p
See also PB85-132389.

The report contains weather maps which gives the numerical probability estimates for seasonal temperature and precipitation in North America.

5. BEHAVIORAL AND SOCIAL SCIENCES

5A. Administration and Management

514,421
AD-A148 852/7/GAR PC **A03/MF A01**
Army War Coll., Carlisle Barracks, PA.
Centralized Control versus Command Flexibility at the Installation.
Study project rept.,
R. B. Granger. 17 May 84, 31p

The basic issue is whether or not the installation commander has lost the flexibility to adjust funding programs in dealing with changing requirements and operating conditions. Data was gathered using a literature search and personal interviews with resource managers of selected installations. The growing number of management initiatives when manpower has been capped and operating funds are constrained by force modernization, translates into missions without resources. To accomplish more using less resources, the commander must be unhindered by program and budget constraints that unduly restricts his flexibility. Therefore, it is concluded that the establishment and micromanagement of economies, efficiencies, and productivity improvement programs, by higher headquarters, have effectively exacerbated a serious resource problem at the installation, and threaten to impair the very activities being managed. The Army should take the following actions: eliminate duplication in management programs and ascertain the net value of expected gains at the installation when viewed as a whole; reduce administrative program and budget constraints imposed on the installation; establish a management philosophy which precludes tasking or accepting additional missions without resources; and minimize withholding of funds and encourage Congress to enact appropriations on a timely basis.

514,422
AD-A148 859/2/GAR PC **A02/MF A01**
Massachusetts Univ., Amherst. Dept. of Computer and Information Science.
Design of a Knowledge-Based Fault Detection and Diagnosis System,
E. Hudlicka, and V. Lesser. 20 Mar 84, 20p Rept no. TR-84-03
Contract N00014-79-C-0439, Grant NSF-MCS80-06327
Presented at the Proceedings of the Hawaii International Conference on System Sciences (17th), v1 p224-230.

This paper presents a design of a knowledge-based fault detection and diagnosis (FDD) component intended to function as part of an intelligent processor (agent) in a distributed problem solving system. This component will permit the system to monitor its own behavior, detect an abnormal system rate, and identify the fault that caused it. Once the fault is identified, the system can repair it or reconfigure itself, thus improving its performance. The heart of the FDD component is a model of the system it is monitoring. This model represents the correct behavior of the system and the criteria for detecting deviations from this behavior. Thus it integrates information necessary for detection and diagnosis into a uniform structure. Detection is accomplished by monitoring the system state and detecting situations which violate the predefined expectations. Diagnosis is accomplished by constructing a representation of the current system state and determining the earliest points of departure from the expected behavior as represented by the correct system model. These points constitute the identified faults. (Author)

514,423
AD-A148 915/2/GAR PC **A02/MF A01**
Massachusetts Univ., Amherst. Dept. of Computer and Information Science.
Use of Meta-Level Control for Coordination in a Distributed Problem Solving Network,
D. D. Corkill, and V. R. Lesser. 1983, 9p
Grant NSF-MCS80-06327

Distributed problem solving networks provide an interesting application area for meta-level control through the use of organizational structuring. We describe a decentralized approach to network coordination that relies on each node making sophisticated local decisions that balance its own perceptions of appropriate problem solving activity with activities deemed important by other nodes. Each node is guided by a high-level strategic plan, which is a form of meta-level control, is represented as a network organizational structure that specifies in a general way the information and control relationships among the nodes. An implementation of these ideas is briefly described along with the results of preliminary experiments with various network problem solving strategies specified via organizational structuring. In addition to its application to Distributed Artificial Intelligence, this research has implications for organizing and controlling complex knowledge-based systems that involve semi-autonomous problem solving agents.

514,424
AD-A148 917/8/GAR PC **A02/MF A01**

Massachusetts Univ., Amherst. Dept. of Computer and Information Science.
Distributed Vehicle Monitoring Testbed: A Tool for Investigating Distributed Problem Solving Networks,
V. R. Lesser, and D. D. Corkill. 1983, 17p
Grant NSF-MCS80-06327

Cooperative distributed problem solving networks are distributed networks of semi-autonomous processing nodes that work together to solve a single problem. The Distributed Vehicle Monitoring Testbed is a flexible and fully-instrumented research tool for empirically evaluating alternative designs for these networks. The testbed simulates a class of a distributed knowledge-based problem solving systems operating on an abstracted version of a vehicle monitoring task. There are two important aspects to the testbed: (1) it implements a novel generic architecture for distributed problem solving networks that exploits the use of sophisticated local node control and meta-level control to improve global coherence in network problem solving; (2)it serves as an example of how a testbed can be engineered to permit the empirical exploration of design issues in knowledge-based AI systems. The testbed is capable of simulating different degrees of sophistication in problem solving knowledge and different focus-of-attention mechanisms, for varying the distribution and characteristics of error in its (simulated) input data, and for measuring the progress of problem solving. Node configurations and communication channel characteristics can also be independently varied in the simulated network. (Author)

514,425
AD-A148 925/1/GAR PC **A02/MF A01**
Massachusetts Univ., Amherst. Dept. of Computer and Information Science.
Coordination in a Distributed Problem Solving Network,
D. D. Corkill, and V. R. Lesser. 1984, 11p
Grant NSF-MCS80-06327

Distributed problem solving networks provide an interesting application area for high-level network coordination through the use of organizational structuring. We describe a decentralized approach to the coordination of these networks that relies on each node making sophisticated local activity decisions. Each node is guided by a high-level strategic plan for cooperation among nodes in the network and must balance its own perceptions of appropriate problems solving activity with activities deemed important by other nodes. The high-level strategic plan, which is a form of meta-level control, is represented as a network organizational structure specifying in a general way the information and control relationships among the nodes. In addition to its application to Distributed Artificial Intelligence, this research has implications for organizing and controlling complex knowledge-based systems that involve semi-autonomous problem solving agents.

514,426
AD-A148 984/7/GAR PC **A03/MF A01**
Vermont Univ., Burlington.
European Scientific Notes. Volume 39, Number 2.
Monthly publication,
L. E. Shaffer. Feb 85, 45p Rept no. ESN-39-2
See also Volume 38, Number 10, AD-A147 985.

European Scientific Notes (ESN) is a monthly publication with brief articles on recent developments in European scientific research. The publication is not intended to be part of the scientific literature. The value of ESN articles to Americans is to call attention to current developments in European science and technology and to the institutions and people responsible for these efforts. ESN authors are primarily ONRL staff members. Occassionally articles are prepared by or in cooperation with staff members of the USAF European Office of Aerospace Research and Development or the US Army Research and Standardization Group. Qualified US scientists travelling in Europe may also be invited to author an ESN article. (Author)

514,427
AD-A149 021/8/GAR PC **A02/MF A01**
Massachusetts Univ., Amherst. Dept. of Computer and Information Science.
Predicting the Performance of Distributed Knowledge-Based Systems: A Modeling Approach,
J. Pavlin. 1984, 6p

A model of a distributed knowledge-based system is presented. The model captures the features specific to those systems, such as alternative paths to the solution utilization of inexact and/or incomplete knowledge and data, dynamic task creation, complex subproblem dependencies and focusing aspect of problem solving. The model is applied to the analysis of communication policies in a distributed interpretation system. The result of the analysis is the best policy for the given environment and system conditions. Another use of the model as a real-time simulation tool is suggested.

514,428
DE85000294/GAR PC **A03/MF A01**
Hanford Engineering Development Lab., Richland, WA.
Quality of Scientific and Engineering Data.
W. L. Delvin. Jul 84, 49p HEDL-7471
Contract AC06-76FF02170

Quality is a subject receiving much attention today within industry and government agencies. This attention focuses basically on the quality of products, which are the outputs of work activities. A primary product of research and development is data, the quality of which should be of concern to both users and the scientists and engineers producing data. The literature offers only bits and pieces of information on the nature of quality as applied to data. Five characteristics of quality data were developed by refining and expanding several concepts found in the literature. These characteristics are Validity, Integrity, Reliability, Preservation, and Retrievability and they collectively define quality as it relates to data. The practices commonly used in research and development to assure quality of data are discussed and related to the five characteristics. This relationship between laboratory practices and the characteristics of quality is a basis for assessing the quality of data. (ERA citation 10:001015)

514,429
NUREG-0325-REV-7/GAR PC **A04/MF A01**
Nuclear Regulatory Commission, Washington, DC.
U.S. Nuclear Regulatory Commission Functional Organization Charts, January 1, 1985.
Jan 85, 59p
See also NUREG-0325-REV-6.

Functional organization charts for the NRC Commission Offices, Divisions, and Branches are presented.

514,430
N85-13662/0/GAR PC **A04/MF A01**
National Aeronautics and Space Administration, Houston, TX. Lyndon B. Johnson Space Center.
NASA/ASEE Summer Faculty Fellowship Program, 1984.
Final Report.
B. C. Mcinnis, M. B. Duke, and B. Crow. Aug 84, 57p
NAS 1.15:87392, NASA-TM-87392
Contract NGT-44-005-803

An overview is given of the program management and activities. Participants and research advisors are listed. Abstracts give describe and present results of research assignments performed by 31 fellows either at the Johnson Space Center, at the White Sands test Facility, or at the California Space Institute in La Jolla. Disciplines studied include engineering; biology/life sciences; Earth sciences; chemistry; mathematics/statistics/computer sciences; and physics/astronomy.

514,431
N85-13664/6/GAR PC **A04/MF A01**
National Aeronautics and Space Administration, Greenbelt, MD. Goddard Space Flight Center.
ASEE-NASA Summer Faculty Fellowship Program (Aeronautics and Research), 1984.
Final Report.
F. Dah-nien, J. R. Hodge, and F. P. Emad. Sep 84, 62p NAS 1.15:87393, NASA-TM-87393
Contract NGT-09-011-060

The 1984 NASA-ASEE Faculty Fellowship Program (SFFP) is reported. The report includes: (1) a list of participants; (2) abstracts of research projects; (3) seminar schedule; (4) evaluation questionnaire; and (5) agenda of visitation by faculty programs committee. Topics discussed include: effects of multiple scattering on laser beam propagation; information management; computer techniques; guidelines for writing user documentation; 30 graphics software; high energy electron and antiproton cosmic rays; high resolution Fourier transform infrared spectrum; average monthly annual zonal and global albedos; laser backscattering from ocean surface; image processing systems; geomorphological mapping; low redshift quasars; application of artificial intelligence to command management systems.

514,432
N85-13681/0/GAR PC **A03/MF A01**
Valtion Teknillinen Tutkimuskeskus, Espoo (Finland).
Activities Report in Technology.
Annual Report, 1983.
1983, 36p ISBN-951-38-1998-1
Original Report Contains Color Illustrations.

Energy, information, chemical, mechanical, building, urban, and safety technology is discussed. Peat pelletization, nuclear fuel behavior, and thermal insulation of buildings were studied. A satellite network for locating ships/aircraft in distress; a small IR analyzer; and a digital analysis system for pictures of cardiac arteries are described. Use of cellulases in brewing; optimization of bread baking; plastics in tribology; acoustic emission inspection of composites; and peat and wood liquefaction are considered. Dezincification resistant brass for gravity diecasting; CAD color fabric design; CAD/CAM in construction; and safety analyses are summarized.

514,433
N85-13765/1/GAR PC **A07/MF A01**
National Aeronautics and Space Administration, Huntsville, AL. George C. Marshall Space Flight Center.
Research and Technology, 1984: Marshall Space Flight Center.
Annual Report.
T. W. Moorehead. Nov 84, 137p NAS 1.15:86476, NASA-TM-86476

The Marshall Space Flight Center conducts research programs in space sciences, materials processing in space, and atmospheric sciences, as well as technology programs in such areas as propulsion, materials, processes, and space power. This Marshall Space Flight Center 1984 Annual Report on Research and Technology contains summaries of the more significant scientific and technical results obtained during FY-84.

514,434
PB85-139624/GAR PC **E05/MF E01**
Council for Scientific and Industrial Research, Pretoria (South Africa). Technical Services Dept.
Mini-Seminar on Value Engineering, South Africa, June 1983.
Jun 83, 84p TSD BOOK-0005/83, ISBN-0-7988-2600-2
See also PB82-110396.

The objective of Value Engineering is to achieve function reliability at the least cost. It does this by subjecting the object of study to the scrutiny of a team of people using a multi-stage job plan. The point of departure in the job plan when compared with normal problem solving techniques is the group of three phases following the initial Information Phase. The problem penetration in the Function Phase permits concentration on the right target areas in the Creation Phase, and the wholly positive approach in the Evaluation Phase ensures the highest reward in terms of creative and cost-effective solutions.

514,435
PB85-140036/GAR PC **A05/MF A01**
Development Alternatives, Inc., Washington, DC.
Building Capacity for Decentralization in Egypt: The Pilot Project and Beyond.
Integrated rural development field rept.,
T. Walker. Jun 82, 93p AID-PN-AAL-702

In furtherance of a policy of decentralization begun in 1960 and promoted dramatically since the late 1970's the Government of Egypt, in cooperation with USAID/E, initiated a project to alleviate the considerable ambiguity and resulting poor performance in economic planning at the governorate level. This paper documents that pilot project which stressed the concept of devolving authority, linking participation to decentralization, and, especially, an action-oriented training approach focused on building institutional capacity. A summary of project activities describes the workshops, surveys, seminars, and other activities undertaken during the planning, implementation, and evaluation/redesign phases. Following this is a digest of lessons learned from the project, especially those regarding implementing decentralization in Egypt, sponsoring

workshops and training, and administering pilot projects.

514,436
PB85-144608/GAR PC **A08**/MF **A01**
Agency for International Development, Washington, DC.
Dissent, Objectivity and Ethics in Program Evaluation,
R. L. Hubbell. May 79, 163p AID-PN-AAM-194

Provoked by an instance in which a member of an A.I.D. evaluation team felt that inadequate attention had been given to his dissenting views, a study was undertaken of A.I.D. evaluation procedures, ethics, and objectives. Findings are herein presented. After stating the problem and reviewing selected writings about evaluation, the author examines the codes of ethics of three professional associations/consultant organizations. A code of ethics for the emerging profession of evaluation is then presented, followed by findings obtained during interviews with A.I.D. evaluation and contract officers, Mission personnel, and evaluation contractors.

514,437
PB85-150357/GAR PC **A06**/MF **A01**
RAND Corp., Santa Monica, CA.
Scientific and Technical Information Transfer: Issues and Options.
T. K. Bikson, B. E. Quint, and L. L. Johnson. Mar 84, 124p N-2131-NSF, NSF/PRA-84015
Grant NSF-PRA84-00689

Results are presented of a project undertaken to identify and assess ways to improve the transfer to potential users of knowledge generated by federally funded research in science and technology. Problems of information quality control are examined, and processes by which scientific and technical knowledge can be tailored and packaged for users are discussed. An overview and evaluation of current federal policies and priorities are provided as is an assessment of alternative policy options. The importance of increasing the selectivity and user-responsiveness of existing formal dissemination systems and coupling them more closely to informal systems is noted. Future directions for research in dissemination policy are suggested and a history of the evolution of relevant federal policies is presented.

514,438
PB85-855310/GAR PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Market Analysis Methods and Techniques. May 1979-1983 (Citations from the Management Contents Data Base).
Rept. for May 79-1983.
Feb 85, 193p

This bibliography contains citations concerning analysis techniques and methods to be applied to market research and market surveys to assist in making marketing decisions. The citations include the theoretical techniques, as well as the specific marketing strategies resulting from analysis performed by some firms or businesses. Applications include manufacturers, construction industry, food industry, service groups, retailers, and metals industry. (This updated bibliography contains 355 citations, none of which are new entries to the previous edition.)

514,439
PB85-855328/GAR PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Market Analysis Methods and Techniques. 1984-January 1985 (Citations from the Management Contents Data Base).
Rept. for 1984-Jan 85.
Feb 85, 112p
Supersedes PB84-859297.

This bibliography contains citations concerning analysis techniques and methods to be applied to market research and market surveys to assist in making marketing decisions. The citations include the theoretical techniques, as well as the specific marketing strategies resulting from analysis performed by some firms or businesses. Applications include manufacturers, construction industry, food industry, service groups, retailers, and metals industry. (This updated bibliography contains 158 citations, all of which are new entries to the previous edition.)

514,440
PB85-855336/GAR PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Project Management. 1970-January 1985 (Citations from the NTIS Data Base).
Rept. for 1970-Jan 85.
Feb 85, 275p
Supersedes PB84-859669.

This bibliography contains citations concerning the planning and methodology for project management. The abstracts pertain to local, state, and federal government reports and studies on project management, and to industries under government contracts. Many abstracts reference reports of results and evaluations of project management techniques applied to specific programs. (This updated bibliography contains 359 citations, 55 of which are new entries to the previous edition.)

5B. Documentation and Information Technology

514,441
AD-A148 965/7/GAR PC **A08**/MF **A01**
Air Force Office of Scientific Research, Bolling AFB, DC.
Air Force Office of Scientific Research (AFOSR) Technical Report Summaries. Third Quarter (CY).
Quarterly rept. Jul-Sep 84,
B. J. Wert. Oct 84, 162p Rept no. AFOSR-TR-84-1104

The AFOSR Technical Report Summaries are published quarterly of each calendar year. They consist of a brief summary of each AFOSR technical report received in the Technical Information Division and submitted to the Defense Technical Information Center for that quarter.

514,442
DE84017419/GAR PC **A07**/MF **A01**
Department of Energy, Washington, DC. Assistant Secretary for Policy, Safety and Environment.
Sourcebook: Gaining Access to US Government Information on the Environment and Natural Resources.
F. M. O'Hara, and L. O'Hara. Nov 84, 127p DOE/PE-T1

This publication is designed to acquaint the reader with the broad range of services and publications that are offered by the US government and that provide information about the environment and natural resources. These sources of information include referral services, public-information offices, computerized data banks, information-analysis centers, and publication-distribution systems as well as published sources like bibliographies, abstract and index journals, reports, handbooks, and atlases. The subject matter covered by this sourcebook includes air pollution, meteorology, water resources and quality, fisheries, aquaculture, marine science, solid and hazardous waste treatment, land use, soil science, population and demography, anthropology, architecture, geography, urban studies, health, biology, agriculture, forestry, habitat, wildlife, geology, minerals, and related sciences and technologies. (ERA citation 10:002435)

514,443
DE85000617/GAR PC **A02**/MF **A01**
Lawrence Livermore National Lab., CA.
Post-Processing of Bibliographic Citations from DOE/RECON, NASA/RECON, and DOD/DROLS. Revision 1.
W. A. Bollinger, V. E. Hampel, I. Harrison, and T. P. Murphy. Aug 84, 17p UCRL-89995-Rev.1, CONF-841243-1-Rev.1
Contract W-7405-ENG-48
International online information meeting, London, UK, 4 Dec 1984.

We have developed an interactive, self-guided program for the joint post-processing of bibliographic citations from the federal information centers of the Department of Energy (DOE), the Department of Defense (DOD), and the National Aeronautics and Space Administration (NASA). This program is currently installed on the Intelligent Gateway Processor of the Technology Information System (TIS/IGP) at the Lawrence Livermore National Laboratory and is under evaluation by the TIS user community from remote terminals by telephone dial-up, over TYMNET, and the ARPA computer network. Users are individually authorized for automated access to specific information centers, and use standard commands for the downloading, compilation, and online review of citations in a common format. Previously reported post-processing capabilities have been further expanded, permitting: (1) online citation review, categorization, and addition of new data elements; (2) disassembly and re-assembly of citations; (3) statistical analysis of data field contents; (4) cross-correlation of data field contents; and (5) concordance generation. In addition, the new two-pass interpreter for the post-processing program permits: the transformation of abbreviated data field names into English names preferred by each agency, the statistical analysis of the density and completeness of data fields in selected sets of bibliographic citations, the elimination of redundant citations (using user-specified criteria), and trend analysis. The latter is a powerful tool for the exploration of time-dependent characteristics in a particular field of research, of an organization, or for an author. Graphical displays of publication rates as a function of time and the normalized statistics of terms used in the description of the work, can be used to signal new directions of ongoing research and the intensity of its support. (ERA citation 10:001706)

514,444
DE85001203/GAR PC **A02**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.
Characteristics of Quality Data.
W. L. Delvin. 1984, 12p HEDL-SA-3176, CONF-840996-3
Contract AC06-76FF02170
11. annual conference of the American Society for Quality Control's Energy Division, Las Vegas, NV, USA, 16 Sep 1984.

A primary product of research and development is data, the quality of which should be of concern to both users and the scientists and engineers producing data. The literature offers only bits and pieces of information on the nature of quality as applied to data. Five characteristics of quality data were developed by refining and expanding several concepts found in the literature. These characteristics are Validity, Integrity, Reliability, Preservation, and Retrievability. As presented in this paper, they provide a comprehensive treatment of the subject and they can provide a basis for assuring and assessing the quality of data. 10 references, 3 tables. (ERA citation 10:004145)

514,445
HRP-0905992/4/GAR PC **A08**/MF **A01**
Western Consortium/Western Center for Health Planning, San Francisco, CA.
Compendium of the Substantive Resource Development Materials of the Plan Documents File.
Nov 84, 167p
Contract PHS-HRA-232-79-0037

The three Centers for Health Planning have indexed and evaluated nearly 800 health planning documents through a project funded by the Office of Health Planning (OHP) of the Bureau of Health Maintenance Organizations and Resources Development (BHMORD). Stringent criteria were used to identify the more substantive and exemplary health planning material which reflect the state-of-the-art in health planning. As a consequence, 236 instances of exemplary material were found and described by the Centers' staffs. The staffs' evaluation summaries of this state-of-the-art material have been edited, sorted, and combined with bibliographic citations to form a compendium for the health planning community.

514,446
N85-13075/5/GAR PC **A05**/MF **A01**
Hokkaido Univ., Sapporo (Japan).
Bulletin of the Faculty of Engineering, Hokkaido University, No. 123.
Oct 84, 89p
In Japanese; English Summary.

No abstract available.

514,447
N85-13445/0/GAR PC **A07**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.

Ocean Services User Needs Assessment. Volume 1. Survey Results, Conclusions and Recommendations.
Final Report.
D. R. Montgomery, R. J. Patton, and S. W. Mccandless. 5 Apr 84, 141p NAS 1.26:174104, JPL-PUB-84-19, NASA-CR-174104
Contract NAS7-918
Sponsored in Part by Noaa.

An interpretation of environmental information needs of marine users, derived from a direct contact survey of eight important sectors of the marine user community is presented. Findings of the survey and results and recommendations are reported. The findings consist of specific and quantized measurement and derived product needs for each sector and comparisons of these needs with current and planned NOAA data and services. The following supportive and reference material are examined: direct contact interviews with industry members, analyses of current NOAA data gathering and derived product capabilities, evaluations of new and emerging domestic and foreign satellite data gathering capabilities, and a special commercial fishing survey conducted by the Jet Propulsion Laboratory (JPL).

514,448
N85-13670/3/GAR PC **A04/MF A01**
National Aeronautics and Space Administration, Huntsville, AL. George C. Marshall Space Flight Center.
Fy 1984 Scientific and Technical Reports, Articles, Papers and Presentations.
J. E. Turner. Nov 84, 68p NAS 1.15:86470, NASA-TM-86470

This bibliography lists formal NASA technical reports, papers published in technical journals, and presentations by MSFC personnel. Abstracts are presented for 58 technical memorandum, and 13 technical papers. Six publications, over 260 contractor reports, and more than 300 papers cleared for publication are cited.

514,449
N85-13683/8/GAR PC **A02/MF A01**
Societe Nationale Industrielle Aerospatiale, Toulouse (France). Direction des Etudes.
Un Systeme de Documentation Electronique (An Electronic Documentation System).
Y. Calderara, C. Chrisment, J. B. Crampes, and G. Zurfluh. 1984, 12p SNIAS-842-111-101
Text in French. Presented at Conv. Informatique 84, 20 Sep. 1984.

An electronic document processing application in aeronautics is discussed. The documents to be recorded in computer systems are studied, classifying content by structure, presentation and information transmitted. The production of technical documentation for the aeronautical industry is described. The application to the production of a maintenance manual is presented.

514,450
PB84-916098/GAR Subscription
National Technical Information Service, Springfield, VA.
NTIS Title Index (Retrospective, 1964-1984).
Quarterly repts.
1984, 8 issues
Supersedes PB82-916096.
Microfiche (48X) available on subscription, North American Continent price $800.00; all others write for quote.

NTIS Title Index covers all reports incorporated into the NTIS Data Base starting with 1964 through 1982. It is issued quarterly; cumulated and merged for two years. Indexes are on 48x microfiche in three sections: (1) Key Word Out of Context (KWOC) Title Index; (2) Accession/Report Number Index; (3) Personal Author Index.

514,451
PB85-120483/GAR CP **T11**
Defense Logistics Services Center, Battle Creek, MI.
H8-1 and H8-2 Cataloging Handbooks.
Data file,
B. Pederson, and R. Hughes. 1984, mag tape DSA/DF-85/003
See also PB84-910905, PB84-911005, PB85-158286, PB84-159294.
Source tape is in the EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products if you have questions.

The H8-1 and H8-2 Cataloging Handbooks contain contractor identification codes for organizations doing business with the government other than manufacturing. The H8-1 is sequenced by name and address code. The H8-2 is sequenced by code to name. It contains five basic elements of data: (1) Titles/Symbols: * = Update Summary - New entry or update since publication of the previous edition. S = Status Designator - Reflects the status condition of the contractor. (2) Supplier's name and address. (3) FC (Federal Code) - The Federal Supply Code for Manufacturers (FSCM) or Federal Supply Code for Non-Manufacturers (FSNM) assigned to the contractor. (4) CAO - A Department of Defense Activity Address Directory (DoDAAD) code which identifies the office/agency administering the contract. (5) ADPP - A DoDDAD code which identifies the automatic data processing point for applicable contract administration.

514,452
PB85-139442/GAR PC **E13/MF E01**
Central Statistical Services, Pretoria (South Africa).
Register of Products Manufactured in South Africa, 1979 (Updated to 1982) (Register van Produkte in Suid-Afrika Vervaardig, 1979 (Bygewerk tot 1982)).
Aug 83, 346p ISBN-0-621-08179-5, R-10-21-37
Summary in Afrikaans.
North American Continent sales only.

The Register of Products Manufactured in South Africa consists of a list of products appearing in the manufacturing census returns together with the names and addresses of the manufacturers. The Census of Manufacturing, 1979 - Part 2 returns were used as basis for the compilation of the register.

514,453
PB85-139848/GAR PC **E11/MF E11**
Oxford Univ. (England).
Directory of Scientific Research, 1984.
Jun 84, 210p

This edition of the Directory of Scientific Research replaces the original version which was published in August 1980. It covers all the Science and Medical Departments of the University, but does not include the Social Sciences or the Humanities.

514,454
PB85-954800/GAR PC **N01/MF N01**
National Technical Information Service, Springfield, VA.
Hospital Information Systems. 1970-January 1985 (Citations from the NTIS Data Base).
Rept. for 1970-Jan 85.
Feb 85, 214p
Supersedes PB84-856079.

This bibliography contains citations concerning development, implementation, and evaluation of hospital information systems. Included are patient medical records, discharge records, nursing staff and scheduling, blood banks, supplies inventories, and management information systems. (This updated bibliography contains 229 citations, 14 of which are new entries to the previous edition.)

514,455
PB85-900100/GAR Subscription
National Technical Information Service, Springfield, VA.
Government Reports Announcements and Index, Volume 85, Numbers 1-26.
Biweekly repts.
1985, 26 issues
Supersedes PB84-900100.
Paper copy available on subscription, North American Continent price $355.00/year; all others write for quote. Single copies also available.

The volumes contain current summaries of new research reports and other specialized information in various categories of interest. It is an all-inclusive biweekly journal published for librarians, technical information specialists, and those requiring all the summaries in a single volume.

514,456
PB85-914000/GAR Standing Order
Patent and Trademark Office, Washington, DC.
United States Trademarks - Registered.
1985, approx. 34 16mm microfilm reels
Supersedes PB84-914000.
Available on Standing Order, Deposit Account required. North American Continent price $19.50/each reel; all others write for quote.

The standing order service provides 16 millimeter microfilm reels of U.S. Trademarks as they are issued by the U.S. Patent and Trademark Office. Over 34 reels are expected to be produced throughout the year covering more than 34,000 registered trademarks. The trademarks on these microfilm reels are arranged by registration number only. No special index or sorting is available.

514,457
PB85-916000/GAR Subscription
National Technical Information Service, Springfield, VA.
NTIS Title Index (Current, 1985-1986).
Quarterly repts.
1985, 8 issues
Supersedes PB84-916000.
Microfiche (48X) available on subscription, North American Continent price $400.00/year; all others write for quote. Includes all entries starting January 1985 through December 1986. See also NTIS Title Index (Restrospective), PB82-916098.

The NTIS Title Index Current Cumulative Index contains all current reports incorporated into the NTIS Data Base. Quarterly indexes, starting with Jan-Mar 1985 are cumulated and merged for two years. Available on 48X microfiche in three sections: (1) (KWOC) Key Word Out of Contex Title Index, (2) Accession/Report No. Index; and (3) Personal Author Index.

5C. Economics

514,458
AD-A148 844/4/GAR PC **A05/MF A01**
Army Research Inst. for the Behavioral and Social Sciences, Alexandria, VA.
Military and Civilian Lifetime Earnings Comparisons.
Technical rept.,
C. Dale, and L. G. Hill. Feb 84, 98p Rept no. ARI-TR-619

The President's Fifth Quadrennial Review of Military Compensation (QRMC) has been directed to study military compensation issues with particular attention paid to military retirement. This report was prepared for the Director of Human Resources Development in the Army's Office of the Deputy Chief of Staff for Personnel, in support of the Fifth QRMC. There is considerable interest in the question whether military personnel are comparably paid relative to their civilian counterparts. Life-cycle earnings comparisons are made here for several categories of Army personnel and civilians. The results show that as of the end of Fiscal Year 1982, many Army personnel are underpaid relative to civilians, especially in highly technical occupations. The results hold even when the analysis includes military housing allowances, PX and commissary privileges, and tax advantages.

514,459
DE84770505/GAR PC **A02/MF A01**
Karlsruhe Univ. (Germany, F.R.). Inst. fuer Wirtschaftstheorie.
Some Environmental Aspects of Optimal Economic Growth.
H. U. Buhl. Apr 83, 14p NP-4770505
U.S. Sales Only.

A multi-sector model of an economy is formulated, discussed, and analysed. Contrary to most of the literature on optimal economic growth it is assumed that the society is not purely consumption maximizing. Thus, environmental disutilities are integrated into the society's objective function. Using discrete dynamic programming methods, optimal investment policies are determined explicitly. It is shown that compared to the optimal consumption level the introduction of positive environmental disutilities yields both, smaller optimal capital stocks and less production. (ERA citation 10:000736)

514,460
DE84770507/GAR PC **A02/MF A01**
Karlsruhe Univ. (Germany, F.R.). Inst. fuer Wirtschaftstheorie.
Optimal Growth Policies for Resource-Dependent Open Economies.
H. U. Buhl, and W. Eichhorn. Mar 83, 18p NP-4770507
U.S. Sales Only.

Based on the observations of worldwide declining economic activity in periods of strongly rising (energy) resource prices a model of a resource dependent economy is formulated and analyzed. Using discrete dynamic programming its optimal investment policy maximizing discounted consumption is calculated explicitly. Beyond that we investigate how the economy optimally reacts to changes of the resource situation. (ERA citation 10:000734)

514,461
DE85002169/GAR PC **A15/MF A01**
Centaur Associates, Inc., Washington, DC.
Options for Coordinating Low-Income Fuel Assistance with Weatherization and Conservation Services.
Feb 82, 326p DOE/PE/70097-T1
Contract AC01-79PE70097
Portions are illegible in microfiche products.

This manual for coordinating low-income fuel assistance with weatherization and conservation services is divided into eight chapters that are presented in three parts. These parts provide: an introduction to the manual describing the objectives of the manual, the rationale for coordination, methods used to prepare the manual, how to use the manual, and background information on the Low-Income Home Energy Assistance Program (LIHEAP) and the Weatherization Assistance Program for Low-Income Persons (WAP); a review of approaches to state and local coordination of energy assistance programs; and detailed descriptions of the primary issues and factors influencing the effectiveness of interprogram coordination. In addition, a series of eight appendices are contained in the manual. These appendices include case studies of several state and local agencies that administered the FY 1981 Low-Income Energy Assistance Program (LIEAP) and other energy assistance programs, an overview of federal, state, private and local energy assistance programs, a bibliography and a glossary of key terms and definitions. (ERA citation 10:000792)

514,462
DE85002811/GAR PC **A03/MF A01**
Stanford Univ., CA. Systems Optimization Lab.
Economic Growth and Dynamic Equilibrium.
G. B. Dantzig. Oct 84, 31p SOL-84-8
Contract AT03-76ER72018
Portions are illegible in microfiche products.

The model described has the same general features of the PILOT dynamic macro-economic model of the US except the current integrable demand functions of final consumers in each time period are replaced by nonintegrable ones derived from those of individual consumers. The path followed by the economy can be found by solving an adjusted primal problem using as objective a discounted sum of functions which are measures of the standard of living in various time periods. Typically this implies growth in the per capita standard of living if the economy has potential for growth. The adjustment, however, uses data derived from the equilibrium solution. We then introduce an important behavioral assumption regarding dual-price profitability conditions - namely that the investor calculates his discounted cash flows by first normalizing prices in each future time period before applying his discount factors. We prove equilibrium solutions in this case exist and discuss techniques for finding them. Finally we develop the form of the nonintegrable per capita demand functions as a function of per capita income based on survey data on the distribution of income shares of individual consumers and consumption patterns as a function of income. (ERA citation 10:002432)

514,463
N85-13684/4/GAR PC **A06/MF A01**
Centre National d'Etudes Spatiales, Toulouse (France).
L'Analyse de la Valeur (Value Analysis).
C. Petitdemange. Jan 84, 110p CNES-NT-110
In French; English Summary.

Industrial competitiveness is analyzed to establish value analysis techniques as a fundamental tool. Product development, user requirements, and cost analysis are discussed. Organization necessary for the implementation of value analysis in the industrial environment is detailed.

514,464
PB85-136331/GAR PC **A07/MF A01**
Agency for International Development, Washington, DC. Office of Evaluation.
Private Sector: Ideas and Opportunities. A Review of Basic Concepts and Selected Experience,
M. Hageboeck, and M. B. Allen. Jun 82, 138p AID PROGRAM EVALUATION DP-14, AID-PN-AAJ-618

In response to the U.S. government's emphasis on private sector initiatives in the development process, A.I.D.'s Bureau for Program and Policy Coordination has been investigating both A.I.D. and non-A.I.D. efforts to foster private enterprise as a means of increasing the resource base and momentum of development. This paper presents preliminary findings of these studies. The first section, written from the entrepreneur's perspective, examines market processes and other key factors influencing the growth of private enterprise in developing countries. Market size, specialization, and participants are considered as is the relationship between market size and enterprise size. Among the other factors discussed are political systems and practices, governmental policy interventions, infrastructure, financial systems, sociocultural practices, and the availability of capital, business expertise, and technology. In Section II, the authors examine the effectiveness, and so far as possible, costs of specific approaches to fostering private enterprise. The final section examines several private sector ventures which have had visible development benefits as a basis for identifying ways for A.I.D. to assess the impacts of existing and future programs. The authors conclude that (1) market mechanisms, when allowed to operate freely, will provide incentives to which the private sector will respond and (2) relatively small public sector investments can effectively stimulate private sector development resources.

514,465
PB85-136760/GAR PC **A04/MF A01**
Agency for International Development, Washington, DC.
Economic Development of Korea: Sui Generis or Generic.
Special study no. 6,
D. I. Steinberg. Jan 82, 62p AID-PN-AAJ-177

Korea's phenomenal economic growth since 1963 is the subject of an eight-volume study prepared by the Korea Development Institute (KDI) and Harvard Institute for Economic Development. The study findings (seven volumes have been published to date) are herein reviewed in an analysis focusing on the replicability of the Korean experience and on the extent to which A.I.D. assistance has contributed to Korean success.

514,466
PB85-136968/GAR PC **A12/MF A01**
Boston Univ., MA.
Labor Markets and Industry in Egypt: Analysis and Recommendations for Employment Oriented Growth,
B. Vermeulen, and G. F. Papanek. Jun 82, 255p AID-PN-AAL-708

Rapid economic growth greatly improved employment opportunities in Egypt during the 1970's. As this report demonstrates, however, this success will be difficult to sustain during the 1980's when, it is expected, 300,000-500,000 additional workers will need jobs each year. Creation of so many new jobs will require much faster employment growth than in the past and can only be accomplished through fundamental policy changes. This analysis of labor markets and industry in Egypt identifies main obstacles to rapid job creation.

514,467
PB85-139228/GAR PC **E12/MF E01**
Pretoria Univ. (South Africa). Bureau for Economic Policy and Analysis.
Role of Mining in the South African Economy,
J. A. Lombard, and J. J. Stadler. 1984, 300p RR-12

The object of the analyses presented in the various chapters of this study is to describe the economic significance of the mining industry in the economy of South Africa in terms of the available official statistical data. For purposes of the analyses, the mining industry was disaggregated into gold, coal and 'other' mining. Although data on mining production is indeed abundant, problems were sometimes encountered with regard to data on certain other important facets of the economic impact of mining. The macro economic dimensions of mining on which this study became focussed are the production function, the investment function, the employment function, the determination of prices and costs, the distribution of the operation surplus, savings-investment equation and the balance of current payments with the rest of the world.

514,468
PB85-139350/GAR PC **E04/MF E04**
London Business School (England). Centre for Economic Forecasting.
Some Issues in Dynamic Modelling and Forecasting,
J. A. Longbottom. Oct 83, 57p DP-116

The specification of large scale econometric models in terms of autoregressive distributed lag equations (ADLE) with associated error correction mechanisms is becoming increasingly popular. However success has not been so marked as can be seen by the rapid rate of redundancy of equations in the pages of model manuals. In this paper we consider reasons for this in the context of an econometric model. It is argued that a specification search based upon these (ADLE) principles will not in general lead to an improvement in model specification unless the restrictions it imposes on the system are valid. However there is nothing in the methodology to ensure that system restrictions are valid. Errors are then compounded by inappropriate dynamic adjustment profiles imposed on the system. The consequences for model building are highlighted in a small macroeconomic model. An alternative research strategy is suggested which is based upon estimation techniques which are more likely to allow us to check the overall system properties of particular single equation specifications.

514,469
PB85-140093/GAR PC **A04/MF A01**
Agency for International Development, Washington, DC.
Private Sector, the Public Sector, and Donor Assistance in Economic Development: An Interpretive Essay.
Discussion paper no. 16,
J. M. Wolgin. Mar 83, 67p AID-PN-AAL-007

To provide A.I.D. with a view of how host country policies, coupled with donor actions, have fostered vital private enterprise economies in developing countries, a study, herein presented, was made of the development history of four countries which have dramatically raised their peoples' standard of living in the last 20 years - Malawi, Cameroon, Thailand, and Costa Rica.

514,470
PB85-140135/GAR PC **A08/MF A01**
Agency for International Development, Washington, DC. Office of Evaluation.
Private Sector Evaluation: The Dominican Republic.
Special study,
R. E. Culbertson, E. Jones, and R. Corpeno. Jun 83, 153p AID EVALUATION SS-16, AID-PN-AAL-018

The single most important element contributing to the growth of the private sector in the Dominican Republic has been the integration, at both program and project levels, of training, technical assistance, and capital assistance. Thus concludes this paper, one of a series of country studies examining A.I.D. assistance to the private sector. After describing historical, geographic, socioeconomic, and public policy factors relevant to private enterprise development in the Dominican Republic, the authors outline the Dominican institutional framework for promoting private sector growth, showing how lenders, training and technical assistance institutions (and organizations that support both credit and training institutions) help to bring about private sector growth as much as do external donors like A.I.D. Case studies of ten lending institutions (four financieras, two commercial banks, and four public sector banks) and of fourteen institutions that serve lenders by providing educational, training, and advisory services to credit recipients are then presented.

514,471
PB85-140168/GAR PC **A05/MF A01**
Agency for International Development, Washington, DC. Office of Evaluation.
Evaluation of Small Enterprise Programs and Projects: Issues in Business and Community Development.
Special study,
R. W. Hunt. Jun 83, 77p AID EVALUATION SS-13, AID-PN-AAL-013

Current interest in small enterprise development reflects a felt need to understand the 20-30 year heritage of efforts to promote this sector, so that future programs may have optimum effects. Based on a review of literature and field practices, this paper records and analyzes evidence regarding effective small enterprise programs. The author explores, in turn, definitions of the small enterprise sector, the effects of definition on the project design and evaluation process, and the question of project impacts on firms, individuals, and communities.

514,472
PB85-140598/GAR PC **A09/MF A01**
Agency for International Development, Washington, DC. Office of Evaluation.
Ventures in the Informal Sector, and How They Worked Out in Brazil.
Special study,
J. Tendler. Mar 83, 195p AID EVALUATION SS-12, AID-PN-AAL-009

Unusually high (92%-98%) repayment rates, a competent and dedicated staff, low overhead, ability to reach firms previously without access to formal credit and to attract public funding, and avoidance of political intervention are some of the strengths which have led many to consider the Northeast Union of Assistance to Small Businesses (UNO), a Brazilian PVO established in Recife in 1973, a model of how to provide credit to small businesses. Surprising weaknesses, however, such as high operating costs (ranging from 46% to over 100% of loan value), low productivity (especially in light of UNO's use of low-paid student workers), slow growth (reaching only 1% of the client population), inability to attract private sector financial support or become financially independent, and the failure of assisted firms to increase output, create new jobs, or gain access to bank credit - cast doubt on the replicability of UNO's program. This study discusses these interrelated strengths and weaknesses in light of UNO's history, operations, and beneficiaries.

514,473
PB85-140606/GAR PC **A07/MF A01**
Agency for International Development, Washington, DC. Office of Evaluation.
Private Sector and the Economic Development of Malawi.
Special study,
J. M. Wolgin, C. Clapp-Wincek, G. Honadle, T. Mahoney, and T. Penner. Mar 83, 127p AID EVALUATION SS-11, AID-PN-AAL-006

Malawi's economic progress since independence in 1964 has been unusually rapid. The private nonagricultural economy has developed, despite a lack of indigenous entrepreneurs; per capita GDP has grown at an annual rate of 2.9%; the government has shifted from a net dissaver to a net saver; employment in the wage sector has increased over 150%; and manufacturing output has almost doubled. Fundamental to this progress, according to this evaluation of the private sector's role in Malawi's economic development, was the government's market-oriented economic policy framework, which permitted development of private enterprise with minimal governmental interference. Three partly private and partly public holding companies were developed, which gradually gained control over much of the private economy, while management remained generally in the hands of the expatriate firms. An Investment Development Bank guided by expatriate personnel mobilized capital and acted as both lender and investor in new enterprises.

514,474
PB85-141042/GAR PC **E07/MF E01**
Pretoria Univ. (South Africa). Bureau of Financial Analysis.
Occupancy, Income and General Statistics of South African Hotels for 1979.
1980, 139p ISBN-0-86979-300-4, D-5

The fifth publication in the series on occupancy, income and general statistics of South African hotels for the year 1979 is offered to the industry, institutional organizations and other interested parties as a sincere attempt by the Bureau to make a contribution to improved organizations and management of a most important industry.

514,475
PB85-141604/GAR MF **A01**
International Bank for Reconstruction and Development, Washington, DC.
Social Methodology for Community Participation in Local Investments: The Experience of Mexico's PIDER (Integrated Program for Rural Development) Program.
World Bank staff working paper,
M. M. Cernea. c1983, 139p WP-598, ISBN-0-8213-0205-1
See also Spanish version, PB85-141612. Library of Congress catalog card no. 83-10560.Color illustrations reproduced in black and white.
Microfiche copies only. Paper copy available from World Bank, 1818 H St., NW, Washington, DC. 20433.

The PIDER rural development program in Mexico has carried out a large-scale effort for the social engineering of beneficiary participation. This paper outlines the history and experiences involved in building up, within the implementing agency, a coherent social methodology for eliciting farmers' participation in identifying priority local investments and implementing them. The methodology to promote peasant participation was articulated only gradually, with help from sociologists and other social scientists, through a long process of designing-testing-learning-revising; action research and social experiments at the community and microregional level were carried out to test and reformulate the participatory approach. The methodology refers to various stages of the project cycle: identification of local investments, planning, implementation, monitoring. Constraints on the application of the participatory program include the rigidity of the bureaucratic structure, cultural constraints, opposition to peasant participation for political reasons, interagency conflicts over policy and procedural issues, and the absence or weakness of village-based peasant organizations.

514,476
PB85-141612/GAR MF **A01**
International Bank for Reconstruction and Development, Washington, DC.
Metodologia Social para la Participacion Comunitaria en las Inversiones Locales: La Experiencia del PIDER (Programa de Inversiones para el Desarrollo Rural) en Mexico (Social Methodology for Community Participation in Local Investments: The Experience of Mexico's PIDER Program).
World Bank staff working paper,
M. M. Cernea. c1984, 152p WP-598S, ISBN-0-8213-0205-1
Text in Spanish. See also English version, PB85-141604. Library of Congress catalog card no. 83-10560.
Microfiche copies only. Paper copy available from World Bank, 1818 H St., NW, Washington, DC. 20433.

The PIDER rural development program in Mexico has carried out a large-scale effort for the social engineering of beneficiary participation. This paper outlines the history and experiences involved in building up, within the implementing agency, a coherent social methodology for eliciting farmers' participation in identifying priority local investments and implementing them. The methodology to promote peasant participation was articulated only gradually, with help from sociologists and other social scientists, through a long process of designing-testing-learning-revising; action research and social experiments at the community and microregional level were carried out to test and reformulate the participatory approach. The methodology refers to various stages of the project cycle: identification of local investments, planning, implementation, monitoring. Constraints on the application of the participatory program include the rigidity of the bureaucratic structure, cultural constraints, opposition to peasant participation for political reasons, interagency conflicts over policy and procedural issues, and the absence or weakness of village-based peasant organizations.

514,477
PB85-141620/GAR MF **A01**
International Bank for Reconstruction and Development, Washington, DC.
Price Distortions and Growth in Developing Countries.
World Bank staff working paper,
R. Agarwala. c1983, 77p WP-575, ISBN-0-8213-0242-6
See also French version, PB85-141638. Also pub. as International Bank for Reconstruction and Development, Washington, DC. rept. no. MANAGEMENT AND DEVELOPMENT SER-2. Library of Congress catalog card no. 83-14835.
Microfiche copies only. Paper copy available from World Bank, 1818 H St., NW, Washington, DC. 20433.

This paper attempts to assess the impact of distortions in prices of goods (traded and nontraded) and factors on growth performance of developing countries. The basic approach followed is that adopted in World Development Report, 1981 and by Messrs. Shankar Acharya and Bela Balassa; in this approach the average performance of countries with high price distortion is contrasted with those with low distortion. The time period covered by the study is the decade of the 1970s, which provided useful material for testing the hypothesis about the role of prices in managing development insofar as during this decade a wide spectrum of policies was followed by different countries over a reasonably long period. (Copyright (c) 1983 The International Bank for Reconstruction.)

514,478
PB85-141638/GAR MF **A01**
International Bank for Reconstruction and Development, Washington, DC.
Distorsions des Prix et Croissance dans les Pays en Developpement (Price Distortions and Growth in Developing Countries).
World Bank staff working paper,
R. Agarwala. c1984, 90p WP-575F, ISBN-0-8213-0242-6
Text in French. See also English version, PB85-141620. Also pub. as International Bank for Reconstruction and Development, Washington, DC. rept. no. MANAGEMENT AND DEVELOPMENT SER-2. Library of Congress catalog card no. 83-14835.
Microfiche copies only. Paper copy available from World Bank, 1818 H St., NW, Washington, DC. 20433.

This paper attempts to assess the impact of distortions in prices of goods (traded and nontraded) and factors on growth performance of developing countries. The basic approach followed is that adopted in World Development Report, 1981 and by Messrs. Shankar Acharya and Bela Balassa; in this approach the average performance of countries with high price distortion is contrasted with those with low distortion. The time period covered by the study is the decade of the 1970s, which provided useful material for testing the hypothesis about the role of prices in managing development insofar as during this decade a wide spectrum of policies was followed by different countries over a reasonably long period. (Copyright (c) 1984 The International Bank for Reconstruction and Development.)

514,479
PB85-141679/GAR PC **A07/MF A01**
Agency for International Development, Washington, DC. Office of Evaluation.
Private Sector: Costa Rica.
Special study,
R. G. Pratt, and C. Adamczyk. Mar 83, 127p AID EVALUATION SS-9, AID-PN-AAL-005

Although a development strategy stressing industrialization based on import substitution and participation in the Central American Common Market (CACM) has helped Costa Rica achieve growth with equity since 1960, the country is now in a severe economic crisis. Key factors endemic to the crisis are identified in this report on the effect of public policies and supporting donor interventions on Costa Rica's recent economic and social history, with special reference to the private sector. It is concluded that: (1) public policies, while fostering economic and social progress, failed to prepare for or adjust to adverse external conditions during 1978-82; (2) donor support, despite major positive contributions, had little effect on these policies; and (3) the private sector, especially the key industries of food processing and apparel, reacted predictably to market and public sector signals throughout the period. Lessons taught by the Costa Rican experience are summarized and private sector needs and constraints for the period of recovery spelled out.

514,480
PB85-143048/GAR PC **A06/MF A01**
Agency for International Development, Washington, DC. Office of Evaluation.
Private Sector: The Tortoise Walk. Public Policy and Private Activity in the Economic Development of Cameroon.
Special study,
S. Schiavo-Campo, and J. L. Roush. Mar 83, 170p
AID EVALUATION SS-10, AID-PN-AAL-004

Cameroon's economic performance over the past 20 years, unlike that of most developing countries, has been remarkably good. To help determine the reasons for this success, this paper examines the effects of public policies on private sector development in Cameroon. Initial sections describe Cameroon's demography and its history and review political and economic development since the country gained independence in 1961. Next, the principles underlying Cameroon's public policies - national unity, political and social order, a mixed degree of government control of the economy, and a slow and cautious approach to economic development - are outlined. Specific government policies and their economic effects are then detailed. External policies are described as being nonrestrictive in regard to international payments and currency exchange, but overly restrictive in regard to commerce, especially exports. Internal economic policies regarding agriculture, finance, and industry are shown to combine direct intervention with a laissez-faire approach. A review of the role of U.S. and other donor assistance to the private sector shows foreign aid to be an important source of import capacity, although increasingly overshadowed by oil revenues. A detailed case study of one of Cameroon's parastatals, the Corporation for the Development of Cotton, is then presented, and the Corporation's success in providing economic opportunities to small farmers without destroying their economic incentives noted. The study concludes that, while the effects of public policies on private development in Cameroon have been mixed, Cameroon's experience demonstrates the viability of a gradual, cautious approach to economic change.

514,481
PB85-143097/GAR PC **A03/MF A01**
George Washington Univ., Washington, DC.
Financial Leverage Potential of Local Currency Proceeds Generated from the Food for Peace Program to Stimulate Private Enterprise in Developing Countries,
E. L. Hullander, N. S. Zank, and C. A. Leachman. 2 Nov 82, 49p AID-PN-AAL-980

Approximately half a billion dollars of local currency generated annually from the sale of P.L. 480 Title I commodities worldwide could be programmed to stimulate host country private sector growth and attract foreign enterprise. Such economic leverage potential is analyzed in this paper. Background is provided regarding historical precedents for the use of P.L. 480 funds to promote private enterprise, and existing and required conditions for such use - the legal authorization (the Agricultural Trade Development Act of 1954), the availability of proceeds through judicious management of the Title I process, and a mechanism (such as intermediate financial institutions) for using local currency. Necessary cost-benefit conditions for private enterprise to accept a leverage offer are examined. Financial leverage through Title I funds is demonstrated in examples where the funds are used to attract capital from both international commercial banks and domestic investment banks, and operating leverage is illustrated by the use of the funds to finance technical assistance.

514,482
PB85-144335/GAR PC **A04/MF A01**
Applied Economics, Newport Beach, CA.
Regional Investment Strategies: Information and Analytical Tools.
Final rept.
Dec 82, 64p EDA-ERD-84-079

The purpose of this study was to determine what data and economic tools would assist the Seattle Regional Office (SRO) in developing a regional investment strategy (RS) for the eight States in the Western Region (Alaska, Arizona, California, Hawaii, Idaho, Nevada, Oregon and Washington) and American Samoa, Guam, and the Trust Territory of the Pacific Islands, an area with a population of 36.5 million persons distributed over approximately 1.2 million square miles. Regional Strategies are necessary to establish the goals and objectives to be achieved with the limited resources available, and to establish the criteria for their efficient and equitable distribution among the six EDA regions, the sub-regions therein, and within programmatic constraints. The FY 1981 Regional Investment Strategy of the SRO was developed under a set of instructions and guidelines promulgated and issued by the Assistant Secretary for Economic Development (A/S). According to these instructions, EDA funds were to be used to promote economic development as contrasted to general community development and to support self-sustaining stability and growth in services by the private, profit-seeking sector.

514,483
PB85-144566/GAR PC **A07/MF A01**
Checchi and Co., Washington, DC.
Mauritania: Rural Assessment and Manpower Surveys. Macro-Economic Simulation Model for Assessing Development Priorities.
Mar 81, 129p AID-PN-AAM-238
Contract AID/afr-C-1489
Sponsored by Berger (Louis) International, Inc., East Orange, NJ., and Action Programs International, Santa Monica, CA.

To help correct Mauritania's misguided capital-intensive development strategy, this paper presents a macroeconomic model for assessing alternative policies for growth during the period 1980-2000. Traditional, industrial, and service sector growth policies, production functions, and investment requirements are evaluated. Gross domestic expenditures and resource gaps are then calculated and results are interpreted with regard to economic and other constraints (e.g. balance of payments and debt service) and basic human needs. A global development strategy option is proposed based on growth policies and performance since the 1960's and on calculation of financial resources and the reoriented operational goal of meeting basic human needs.

514,484
PB85-144574/GAR PC **A06/MF A01**
Checchi and Co., Washington, DC.
Mauritania: Rural Assessment and Manpower Surveys. Rural Income in Mauritania.
1981, 103p AID-PN-AAM-224
Contract AID/afr-C-1489
Sponsored by Berger (Louis) International, Inc., East Orange, NJ., and Action Programs International, Santa Monica, CA.

Results of a 1979-80 pilot survey to assess household cash income in Mauritania's rural sector are presented in this report. Cash income in the sedentary and nomadic rural sectors is examined according to its various sources (e.g., traditional occupations, wages, and cash transfers), patterns of income distribution, and (for the sedentary sector only) ethnic group. Finally, the cash income structure for the rural sector as a whole is examined and budgeting patterns in the sedentary and nomadic subsectors are delineated.

514,485
PB85-144996/GAR PC **A04/MF A01**
Checchi and Co., Washington, DC.
Mauritania: Rural Assessment and Manpower Surveys. Employment Implications of Alternative Development Strategies.
Jun 81, 60p AID-PN-AAM-243
Contract AID/afr-C-1489
Sponsored by Berger (Louis) International, Inc., East Orange, NJ., and Action Programs International, Santa Monica, CA.

Mauritania's high level of unemployment and underemployment is one of the most serious of its economic development problems, according to this sector report. Data (including 20 tables) on current (1977) labor supply and literacy and educational levels are presented and analyzed, and projections are made of labor availability and labor requirements for the period 1980-2000. Three major policy options to encourage the generation of employment are identified: (1) Option A - full employment as the primary planning goal; (2) Option B - a blend of social concern for employment and economic concern for the efficiency of products; and (3) the currently stressed Option C - rigorous subordination of employment to capital-intensive production.

514,486
PB85-145910/GAR PC **E03/MF E01**
Foersvarets Forskningsanstalt, Stockholm (Sweden).
Dimensionering och Finansiering av Gemensamma Resurser (Supply and Financing of Common Resources),
P. Molander. Oct 84, 20p FOA-C-10261-M8
Text in Swedish.

Systems with several users appear in many areas in society. The supply of such common resources (or collective goods) is a classical problem in economics. If no measures are taken, there is a general tendency to under-supply of such goods. The report describes some methods for handling the problem and discusses their potential use in defense planning.

514,487
PB85-146108/GAR PC **A06/MF A01**
Faucett (Jack) Associates, Inc., Chevy Chase, MD.
Stability of Commodity Trade Flows in Interregional Input-Output Tables.
Final rept.
Apr 83, 110p EDA/RED-84-65
Grant EDA-99-7-13527

This report presents the findings of research on the intertemporal stability of interregional commodity flow coefficients. These coefficients represent the share of the consumption in each state (region) of each commodity group that is accounted for by each state (region) of origin. These coefficients are used in multiregional input-output models to link the regional economies. These links transmit the impacts of production in each state on input supplying industries within the state and in other states. Thus, these coefficients are vital in tracing the regional output and employment impacts of projected changes in the demand for final products. The models work best when the coefficients are relatively stable over time, or when changes in the coefficients are predictable. Unfortunately, the research results indicate much less stability in the coefficients than is desirable. The stability was measured using data for 1967 and 1972 (and in a more limited fashion using data for 1972 and 1977) from the Commodity Transportation Survey of the Census of Transportation, covering only manufactured products of domestic origin.

514,488
PB85-146553/GAR PC **A02/MF A01**
Manalytics, Inc., San Francisco, CA.
U.S.-Flag Crosstrading. Volume 1. Executive Summary.
Final rept.,
R. L. Hanelt, B. E. Raifas, and E. Schrier. Dec 84, 25p MA-MD-820-85010
Contract DTMA91-83-C-30045
See also Volume 2, PB85-146561. Prepared in cooperation with TRG Washington Group, Inc., Falls Church, VA.
Also available in set of 3 reports PC E99, PB85-146546.

This volume summarizes foreign impediments to U.S.-flag crosstrading operations and forecasts the impediments likely to face U.S.-flag carriers in the future. It presents a summary of U.S.-flag crosstrading capacity and highlights the policy options available to the United States to remove impediments to the U.S.-flag crosstrading.

514,489
PB85-146561/GAR PC **A06/MF A01**
Manalytics, Inc., San Francisco, CA.
U.S.-Flag Crosstrading. Volume 2. U.S.-Flag Crosstrading Operations and U.S. Policy Options.
Final rept.,
R. L. Hanelt, B. E. Raifas, and E. Schrier. Dec 84, 120p MA-MD-820-85011
Contract DTMA91-83-C-30045
See also Volume 1, PB85-146553, and Volume 3, PB85-146579. Prepared in cooperation with TRG Washington Group, Inc., Falls Church, VA.
Also available in set of 3 reports PC E99, PB85-146546.

This volume presents quantitative analysis of the amount of crosstrading (the carriage of cargo from one foreign country to another foreign country) performed by U.S.-flag operators and the amount of crosstrading performed by foreign flag operators in U.S. foreign trades. This report also presents an analysis of the policy options available to the United States to remove impediments to U.S.-flag crosstrading.

514,490
PB85-146579/GAR PC **A04/MF A01**
Manalytics, Inc., San Francisco, CA.
U.S.-Flag Crosstrading. Volume 3. Impediments to U.S.-Flag Crosstrading Operations.
Final rept.,
E. T. Bauer, and D. C. Tucker. Dec 84, 68p MA-MD-820-85012
Contract DMTA91-83-C-30045
See also Volume 2, PB85-146561. Prepared in cooperation with TRG Washington Group, Inc., Falls Church, VA.
Also available in set of 3 reports PC E99, PB85-146546.

The volume identifies foreign impediments to the U.S.-flag crosstrading (the carriage of cargoes between foreign countries) and forecasts the impediments likely to face U.S.-flag carriers in the near future.

514,491
PB85-147791/GAR PC **A05/MF A01**
Denver Research Inst., CO.
International Transfer and Acquisition of Technology: Documentary Review,
R. P. Black, W. M. Todd, and M. Cain. Mar 83, 85p
AID-PN-AAN-103
Contract AID/otr-0092-C-00-2280-00

Technology transfer from industrialized to developing countries has given rise to official concerns about technology 'packaging,' restrictive controls on technology use, inappropriate technology choices, and high costs. This review critically examines current literature on technology transfer. Technology transfer is first viewed historically and from the perspective of developing countries. Commercial technology transfer is then discussed, with reference to the role of multinational corporations, the appropriability theory (which explains efforts to protect sophisticated technologies from being stolen), induced innovation, the product cycle (from custom-made to standardized), technology acquisition, appropriate technology, and developing country technology transfer policies. Next, pertinent trends from development literature on health, construction and building materials, PVO's, agriculture, and A.I.D. evaluations are discussed. Finally, the technology transfer components of selected A.I.D. projects, policy statements, and evaluation documents are assessed.

514,492
PB85-928000/GAR Standing Order
Central Intelligence Agency, Washington, DC.
All Non-Communist Country Reports.
Irregular repts.
1985, open series
Supersedes PB84-928000.
Paper copy available on Standing Order, Deposit Account required. North American Continent price based on page count of individual documents; all others write for quote. This series offers a reduction in price as a Standing Order. Single copies also available.

Subscription to this service automatically brings the full text of 'all non-communist country reports', issued by the Central Intelligence Agency. The information reported is political, statistical, and economical in such areas as agriculture, metals, minerals, natural gas, oil, materials, political, economic, and military structures of non-communist countries. Maps included.

5D. History, Law, and Political Science

514,493
AD-A148 872/5/GAR PC **A04/MF A01**
Army War Coll., Carlisle Barracks, PA.
Counterforce Deadlock: Are Arms Control Agreements Still Possible.
Study project rept.,
F. H. Carde. 15 May 84, 59p

The collapse of INF, START, and MBFR talks in December 1983 brought arms control negotiations to a complete stop and injected a chill into relations between the superpowers. In examining the record of talks, the author finds that previous SALT talks had been motivated by a desire to put caps on the other side's force development, in an effort to simplify its own budget planning. Destabilizing technologies in pursuit of counterforce strategies are increasingly making treaty verification uncertain. With both the U.S. and Soviet Union determined to make significant reductions in intercontinental and theater nuclear forces, a new perspective must be found to structure the talks. The author proposes a minimum countervalue posture providing both sides' security needs. A review of negotiating problems concludes this paper.

514,494
AD-A148 873/3/GAR PC **A03/MF A01**
Army War Coll., Carlisle Barracks, PA.
Military Industrial Complex: A Discussion of Selected Issues.
Study project rept.,
N. W. Meoni. 3 Apr 84, 49p

Recent defense budgets under the Reagan Administration have again fired up the controversy concerning the ominious 'Military Industrial Complex', coined into existence by President Eisenhower over 23 years ago. This paper examines two major issues surrounding the 'complex' : (1) Is the complex the new phenomena Eisenhower spoke of or is it the evolved relationship deeply set in our American society from its beginnings as a nation. This is addressed in an historical perspective by tracing the evolution of the military-industrial relationship over our history as well as commenting on the need for this relationship. (2) Is the complex wasteful, corrupt and exerting too strong an influence on the nations resources. Each of these criticisms are presented in the form articulated by the opponents of the complex, rebuttal arguments are presented, followed by an analysis of available data. A conclusion is made as to the validity of each of the criticisms.

514,495
AD-A148 941/8/GAR PC **A03/MF A01**
Army War Coll., Carlisle Barracks, PA.
Soviet Mid-Term Objectives, Strategies, and Prospects in Sub-Saharan Africa.
Student essay,
R. F. Collins. 19 Oct 84, 30p

The author examines the basic question of the likelihood of the Soviet Union's achieving its objectives in Sub-Saharan Africa in the next five to ten years. He briefly outlines the practices and methods employed by the USSR over the past 20 years while illustrating that the USSR has been compelled to modify its strategies based on changing local conditions. Specific volatile areas in Sub-Saharan Africa, such as South Africa and the Horn of Africa, are not addressed specifically, but rather included in the overall pattern of Soviet strategies. Research and analysis are based on documented Soviet activities, US government publications, and current Western academic efforts. Soviet emphasis in the mid-term, as it has been in the past, will be on arms sales. The author disputes the belief that Africa is ripe for Soviet adventurism. There are an increasing number of restraints, both domestically and regionally, that operate against the USSR. The US is best served by staying aware of Soviet activities, supporting democratic processes, and encouraging African nations to address and solve African problems.

514,496
AD-A148 983/0/GAR PC **A05/MF A01**
Army War Coll., Carlisle Barracks, PA.
Africa: A Strategic Factor in the Strategic Equation of the World.
Study project,
M. T. Kontagora. 2 May 84, 81p

The title of this study should in fact be a question: Is Africa a factor of any worth in the strategic equation of the world. The relevance and the importance of the question have increased since my recent close association with United States' government policy and public attitudes and perceptions regarding Africa. During the 1960's and the early 1970's, the United States virtually blanked out most of Africa in its foreign policy and generally regarded the continent as an area of European influence. Except for uncoordinated and generally unpopular decisions regarding apartheid in South Africa and direct participation in two invasions in the Zaire Republic, Africa was and remains low in United States' policy considerations. At the same time while professing solidarity with the African in his fight for freedom, the USSR is suspected of regarding Africa and Africans as no more than suitable vehicles for the achievement of its goal for supremacy over the West and, in particular, over the United States. Because the United States and the USSR are the two superpowers of the world today, they ultimately determine who and what is important. Their apparent shortsightedness regarding the high potential of Africa's human and material resources and their underestimation of the determination of the African to be free and to take his place in the scheme of things is alarming.

514,497
AD-A148 998/8/GAR MF **A01**
Army Command and General Staff Coll., Fort Leavenworth, KS.
Toward a Theory of Military Involvement in National Development in Underdeveloped Countries.
Master's thesis,
F. S. Bautista. 1 Jun 84, 126p SBI-AD-E751 157
Availability: Microfiche copies only.

This study examines the proposition that military institutions in underdeveloped or developing countries offer significant advantages when they are given a role in national development. The investigation focuses mainly on the non-military and non-political role of the military. Evidence shows that in many underdeveloped countries today, the political role of the military becomes dominant and leads it to assume political power. More than fifty percent of the member states of the United Nations are run by military regimes or civil-military coalitions dominated by officers. However, evidence also shows that military institutions today have been performing non-political tasks that support civilian institutions and which produce results that enhance human welfare and national development. (Author)

514,498
AD-A149 004/4/GAR MF **A01**
Army War Coll., Carlisle Barracks, PA.
Parameters, Journal of the US Army War College, Volume 14, Number 4, Winter 1984.
1984, 99p
Availability: Superintendent of Documents, GPO, Washington, DC 20402 PC $4.50. Microfiche furnished to DTIC (and NTIS) users.

Contents: Communist Offensive Strategy and the Defense of South Vietnam; Campaign Planning, Comparative Strategic Culture; Afghanistan Stalemate: 'Self-Determination' and a Soviet Force Withdrawal; Nuclear Power in Brazil; The Soviet-Bulgarian Alliance: from Subservience to Partnership; Mexico's National Security; View from the Fourth Estate: The Impact of Surprise and Initiative in War.

514,499
NUREG/BR-0025-85/01/GAR PC **A02/MF A01**
Nuclear Regulatory Commission, Washington, DC. Office of State Programs.
Information Report on State Legislation, Vol. 10, No. 7, December 1984.
Annual summary rept.
Dec 84, 15p
See also NUREG/BR-0025-83/07.

This will be the last issue of 'The Information Report on State Legislation,' NUREG/BR-0025. For eight years, the Report has informed the NRC, State officials, private industry and members of the public in all 50 States of trends and events reflected in nation-wide nuclear legislation. The decision to cancel the Report was made reluctantly. There have been several noteworthy events which have occurred since the last issue in July 1984. In the low-level waste area, the Midwest Compact was introduced in both Houses of Congress (S. 3091, H.R. 6937), for a total of five compacts to be considered for consent in the next Congressional session (Northwest, Central, Rocky Mountain, Midwest and Southeast). The Office of State Programs (OSP) held a workshop in May 1984 on shallow land burial and alternative low-level waste technologies.

514,500
N85-13689/3/GAR PC **A13/MF A01**
National Aeronautics and Space Administration, Washington, DC.
International Comparative Study of Systems for the Government Advancement of Research and Development.
M. Ripke, and R. Foerst. Oct 84, 298p NAS 1.15:77589, PLI-1268-1, NASA-TM-77589
Contract NASW-3541
Transl. into English of "International Vergleichende Untersuchung Zu Verfahrensfragen bei der Staatlichen Forderung von Forschung und Entwicklung"

Rept. Pli-1268-1 Bundesministerium fuer Forschung und Technologie, Bonn, Nov. 1983 p 1-157. Transl. by Kanner (Leo) Associates, Redwood City, CA.

The reorganization, structure and instruments of government advancement of research in three countries was compared: France, Sweden and the USA. In France the powers are centralized; in Sweden and the USA, decentralized. Assistance to projects is provided with grants and contracts in all three countries. France and Sweden also give loans with conditional waiving of reimbursement in case of failure. In all three countries indirect assistance is provided only with small tax breaks.

514,501
PB84-916702/GAR PC **A15/MF A01**
National Transportation Safety Board, Washington, DC. Office of Administrative Law Judges.
Transportation Initial Decisions and Orders and Board Opinions and Orders Adopted and Issued during the Month of February, 1984.
1984, 338p NTSB/IDB00-84/02
Paper copy also available on subscription, North American Continent price $200.00/year; all others write for quote.

This publication contains all Judge Initial Decisions and Board Opinions and Orders in Safety Enforcement and Seaman Enforcement Cases for the month of February, 1984.

514,502
PB84-916703/GAR PC **A15/MF A01**
National Transportation Safety Board, Washington, DC. Office of Administrative Law Judges.
Transportation Initial Decisions and Orders and Board Opinions and Orders Adopted and Issued during the Month of March, 1984.
1984, 331p NTSB/IDB00-84/03
Paper copy also available on subscription, North American Continent price $200.00/year; all others write for quote.

This publication contains all Judge Initial Decisions and Board Opinions and Orders in Safety Enforcement and Seaman Enforcement Cases for the month of March, 1984.

514,503
PB84-916704/GAR PC **A20/MF A01**
National Transportation Safety Board, Washington, DC. Office of Administrative Law Judges.
Transportation Initial Decisions and Orders and Board Opinions and Orders Adopted and Issued during the Month of April, 1984.
1984, 455p NTSB/IDB00-84/04
Paper copy also available on subscription, North American Continent price $200.00/year; all others write for quote.

This publication contains all Judge Initial Decisions and Board Opinions and Orders in Safety Enforcement and Seaman Enforcement Cases for the month of April, 1984.

5E. Human Factors Engineering

514,504
AD-A148 924/4/GAR PC **A03/MF A01**
Naval Submarine Medical Research Lab., Groton, CT.
Guidelines for the Use of Color in SUBACS (Submarine Advanced Combat System) A Displays.
Interim rept.,
D. F. Neri, and D. Zannelli. 16 Oct 84, 26p Rept no. NSMRL-1032

Preliminary guidelines for the implementation of color in Submarine Advanced Combat System (SUBACS) displays have been formulated based on the human factors literature and examples of color coding in existing displays. This allows absolute identification of color with a minimum period of learning. The coding scheme conforms with the cultural convention of associating green or blue with normal operating conditions, yellow with a cautionary state, and red with threat or danger. It was recommended that blue not be used for alphanumerics to avoid the loss of acuity that often results. The use of dim white lighting with color CRTs was recommended and reasons supplied for its advantages over the other possibilities. Originator-supplied keywords include: Sonar displays, and Visual displays.

514,505
PB85-137925/GAR PC **A06/MF A01**
Instituto Nacional de Alimentacion y Nutricion, La Paz (Bolivia).
Prevalencia de Bocio Endemico en la Poblacion escolar de Bolivia (Prevalence of Endemic Goiter in the School Population of Bolivia),
R. Vera, G. Varela, M. Feraudi, V. Cossio, and R. Lopez. 1981, 110p AID-PN-AAL-695
Text in Spanish.

Although goiter has been endemic in Bolivia since the days of colonization, the actual magnitude and severity of the disease has never been measured. This 1981 study by the Instituto Nacional de Alimentacion y Nutricion was conducted to statistically measure the prevalence of goiter among school children in Bolivia. After an outline of the study's objectives and methodology, measures of the prevalence of goiter at the national level, by geographic area, and by political department are presented and the results discussed.

514,506
PB85-854990/GAR PC **N01/MF N01**
National Technical Information Service, Springfield, VA.
Human Factors Engineering in Motor Vehicles. 1976-February 1985 (Citations from the Engineering Index Data Base).
Rept. for 1976-Feb 85.
Feb 85, 125p
Supersedes PB84-865815.

This bibliography contains citations concerning the design and engineering of motor vehicles with regard to ergonomics, man-machine systems, and behavioral research. Design standards by the International Standards Organization, and human tolerances studies related to crash tests, and computer models utilized for performance and predictive evaluations are discussed. Accident-related injuries, and their causes and effects, including wind factors, road conditions, noise levels, and other external factors that contribute to vehicle occupant safety, are discussed. (This updated bibliography contains 162 citations, 17 of which are new entries to the previous edition.)

5F. Humanities

514,507
AD-A148 958/2/GAR PC **A06/MF A01**
Department of State, Washington, DC. Office of External Research.
Political Impact of Islam in Sudan: Numayri's Islamization Program.
J. O. Voll. Sep 84, 108p FAR-140-84
Prepared in cooperation with New Hampshire Univ., Durham.

This research study deals with the general subject of the political impact of Islam in the Sudan through an analysis of the Islamization program recently initiated by President Ja'far Numayri. Part I provides a basic summary of the extended analysis. It provides general coverage of the more detailed analysis and is an outline of that analysis. Part II presents the basic conclusions of the report in terms of general interpretations and implications for Sudanese and U.S. policy. The more detailed analysis is presented in the final two sections of this report. These parts provided the expanded explanations for the points made in Part I of this presentation.

514,508
AD-A148 985/5/GAR PC **A99/MF E03**
Soil Systems, Inc., Marietta, GA.
Yaughan and Curriboo Plantations: Studies in Afro-American Archaeology.
Final rept.,
T. R. Wheaton, A. Friedlander, and P. H. Garrow. Apr 83, 775p
Contract CX-5000-9-5950

This report details an archaeological testing and mitigation effort conducted by Soil Systems, Inc. at six historic sites in Berkely County, South Carolina. The purpose of the project was to assess the significance of the sites and to mitigate the construction impacts of the U.S. Army Corps of Engineers' Cooper River Rediversion Canal Project. Five sites were tested during spring 1979. Three of these sites and an additional site recommended by Interagency Archaeological Services-Atlanta were subjected to intensive data recovery during the summer and fall of 1979. Twenty-nine structures and many associated features were examined at two eighteenth century plantations. Historical research produced evidence sufficient to characterize their slave occupations. The results of this research included extensive archaeological and historical data shedding light on eighteenth century African slaves. The conclusions offer new insights into the institution of slavery and offer a basis for future research.

514,509
PB85-144640/GAR PC **A07/MF A01**
Oklahoma Conservation Commission, Oklahoma City.
Archeological/Historical Review of the Garrison Creek Watershed and the Effect of Channel Construction on Cultural Resources.
Final general survey rept.,
C. S. Wallis. Dec 83, 149p OCC/GSR-83/5
Sponsored by Department of Agriculture, Stillwater, OK. Soil Conservation Service.

A pedestrian survey was conducted during early 1983 along the margins of the proposed channel improvements to the west of Fort Smith, Arkansas, within the Garrison Creek Watershed bottoms, Sequoyah County, Oklahoma. As a result of this work, 40 archaeological sites and 18 'find localities' were recorded. The sites range in age from the Late Archaic/Woodland times up through the Late Historic period.

514,510
PB85-144657/GAR PC **A07/MF A01**
Oklahoma Conservation Commission, Oklahoma City.
Archaeological Investigations at the Spring Creek Site (34Ln-76), Lincoln County, Oklahoma.
Archeological research rept. no. 11,
M. B. Mayo. Aug 84, 135p OCC-ARR-11
Sponsored by Soil Conservation Service, Stillwater, OK.

During 1983, four block areas were excavated as a mitigation phase at the Spring Creek site in Lincoln County, Oklahoma. Three stratigraphically separate components were identified. The earlier two are Plains Woodland occupations; whereas the later is an early Plains Village occupation. Radiocarbon dates for the two most recent components span A.D. 760-930 and A.D. 900-1090. Changes in artifact frequencies suggest a slight shift from plant processing during the Woodland period towards intensified hunting during the Plains Village period. Although 15 percent of the lithic debitage is from non-local sources, most of it is derived from northeastern Oklahoma. These items appear to have been carried to the Spring Creek site as part of personnal tool kits of people who passed through the source area, rather than through trade.

514,511
PB85-144673/GAR PC **A11/MF A01**
Oklahoma Conservation Commission, Oklahoma City.
Geomorphology and Archaeology of Carnegie Canyon, Fort Cobb Laterals Watershed, Caddo County, Oklahoma.
Archeological research rept. no. 10,
C. Lintz, S. A. Hall, and A. Hood. Feb 83, 238p OCC-ARR-10
Sponsored by Soil Conservation Service, Stillwater, OK.

During 1981, geomorphic studies and archaeological test excavations were conducted in Carnegie Canyon in order to evaluate sites 34Cd-121 and 34Cd-76 for their potential eligibility to the National Register of Historic Places. Geomorphic studies focused on an 11 meter deep soil profile of the canyon walls. Numerous paleosols, calcium carbonate incrustations, a fossil spring conduit, molluscan remains and 63 tree stumps buried between 7 and 11 meters deep and radiocarbon dated between 2600 and 3200 years ago were used to develop a model of climatic change for western Oklahoma, as reflected in fluctuations in the watertable levels within the canyon.

514,512
PB85-145654/GAR PC **A10/MF A01**
Oklahoma Conservation Commission, Oklahoma City.

Report of Archeological Work Conducted in the Okfuskee County Tributaries Watershed between 1979 and 1984; and Analysis of the Historic Components at the Cow Creek Site, 340I-24.
Final general survey rept.,
C. S. Wallis. Aug 84, 213p OCC/GSR-84/3
Sponsored by Department of Agriculture, Stillwater, OK. Soil Conservation Service.

Nine prehistoric sites, eleven historic sites, and nine isolated find localities have been recorded. The sites range from Late Archaic through recent Historic Periods. Test excavations are recommended for the two prehistoric sites within the impact zone. A detailed description of materials from the multicomponent Cow Creek Site, 340I-24, are presented.

5G. Linguistics

514,513
SHR-0012016/GAR PC **A03/MF A01**
Northwest Regional Educational Lab., Portland, OR.
Study of English Language Training for Refugees in the United States. Phase 3: The Influence of Language Training and Employment on Adult Refugees' Acquisition of English.
Technical rept.,
J. Arter, W. Hadley, and S. Reder. Jun 84, 48p
Contract DHHS-100-81-0066
Sponsored by Social Security Administration, Washington, DC. Office of Refugee Resettlement.

Results of the third phase of a study of English language training for Southeast Asian adult refugees are presented. This phase entailed a measurement of adult refugees' acquisitions of English as it related to language training and employment. The study addressed the issues in the debate as to whether self-sufficiency is best promoted through encouraging immediate employment or whether it is best promoted through a preliminary period of intensive language training. In addition, it sought to discern whether certain identifiable categories of individuals might profit from one or the other option. The results indicate that language training promotes acquisition of English much more than employment. In some cases, employment retarded language acquisition. However, employment does provide certain social benefits that, in turn, combine with language training to facilitate fluency in English. When the training is offered early in the resettlement process, there are not subgroups for which the results differ. The most important indicator of English skill is the amount of previous education. Age and gender are also factors in this group's ability to learn the new language. Two figures, eight tables, and an appendix devoted to study design and analysis are included.

5I. Personnel Selection, Training, and Evaluation

514,514
AD-A148 903/8/GAR PC **A03/MF A01**
Jacksonville State Univ., AL.
Statistical Analysis of Helicopter Pilot Performance during Instrument Flight Across Repeated Flights.
Annual rept. 15 Sep 81-14 Sep 82,
D. J. Folds, G. W. Yunker, and T. A. Smith. 15 Dec 82, 40p
Contract DAMD17-81-C-1174

The visual performance of helicopter pilots during simulated extended operations was examined in terms of methodological issues and statistical analysis. Visual performance data collected, but not analysed, during a simulated extended operations study by investigators at the U.S. Army Aeromedical Research Laboratory (USAARL), Ft. Rucker, Alabama, served as the data base. The dependent variables associated with visual performance during IFR were factor analysed and it was concluded that the data could be largely accounted for by two orthogonal factors: measures of the relative importance of an instrument during a flight segment and measures of the central tendency of the fixation times. Several findings reported in the USSARL Report No. 78-6 were replicated in this study but the three zone/cost factor theory offered in that report was not supported empirically. Statistical analyses revealed several differences in the use of the instruments as a function of flight maneuver (instrument take-off, cruise flight, and instrument landing), but no differences that could be attributed to the effects of fatigue.

514,515
AD-A148 909/5/GAR PC **A09/MF A01**
Air Force Human Resources Lab., Brooks AFB, TX.
Air Force Civilian Potential Appraisal System: Development.
Final rept. Jul 77-Apr 81,
R. B. Gould, D. E. Black, and W. H. Cummings. Nov 84, 197p Rept no. AFHRL-TP-84-28

An appraisal system for use by the Air Force in ranking competitive position civilian promotion eligibles was developed to meet legal and operational requirements. Demographic data and supervisor and peer ratings were obtained from a 20,000 case target sample to establish a pool of possible ranking elements. Variable reduction procedures eliminated those elements which are redundant, showed greatest likelihood of creating adverse impact, or which appeared less defensible legally or psychometrically. The remaining variables were submitted to 12-member promotion data panels for each of 23 homogeneous job family clusters. Policy-capturing techniques resulted in regression-weighted promotion algorithms that use unique combinations of 19 behavioral dimensions, depending on the job family and supervisory or nonsupervisory classification of the job to be filled. Correlations between job-family-specific, promotion panel rankings and algorithm-developed rankings ranged from .92 to .98, indicating remarkably consistent panel member policies and high agreement between raters. Separate panels convened for two job families resulted in cross-validation correlations of .94 to .98 between their rankings indicating that the algorithms do not reflect just the judgment of panel members who happened to be selected but rather are indicative of the judgments of experienced members of an entire job family. A single supervisory rating form and 40 job-family-specific algorithms were recommended for operational implementation. (Author).

514,516
AD-A148 911/1/GAR PC **A03/MF A01**
Army Research Inst. for the Behavioral and Social Sciences, Alexandria, VA.
Evaluation of an Advanced Combat Vehicle Identification (CVI) Training Program (Masking): A New Approach to Target Acquisition Training.
Research rept.,
G. L. Shope, N. D. Smith, O. H. Heuckeroth, W. L. Warnick, and S. S. Essig. Mar 84, 44p Rept no. ARI-RR-1368
Contract MDA903-83-C-0033

This advanced CVI training program (Masking) presents vehicles in hull and turret defilade. Forty-three personnel were trained with either this advanced CVI training program (Masking) or the Basic CVI Training Program (Masking) at (GTA-17-2-9) either 1250 meters or 2000 meters. Performance on an initial test of all the vehicles administered before training was compared with performance on the same test after training to evaluate the effectiveness of the training program. Data indicated this advanced CVI training program (Masking) is an effective training system for what is perceptually a very difficult task. (Author).

514,517
AD-A148 949/1/GAR PC **A02/MF A01**
Army War Coll., Carlisle Barracks, PA.
Ethics and the Army Officer: An Assessment and Recommendations for the Future.
Student essay,
R. N. Murray. 19 Apr 84, 24p

For the last fifteen years the Army officer corps has been criticized extensively for deficiencies in its ethical conduct and conscience. The indictment charges that the corps has progressively degenerated in its ethical deportment to the point where national security is being jeopardized, and critics are calling for a total catharsis. This article examines these charges and proposes several recommendations for improvement. Data used in the preparation of this essay were gathered from relevent literature, personal interviews, and the author's experiences and observations. After a brief introduction showing the role of Army officers in national and world affairs, this presentation supports the need for Army officers' maintaining high ethical deportment. The essay also concludes that aspersions against Army officers for their lack of ethics are inflated and are magnified by the media and other critics. Nor does the Army's ethical conduct jeopardize readiness. The article then concludes by recommending that education, communications, and other institutional utensils be employed to improve and sustain high ethical conduct on the part of the Army officers. (Author)

514,518
AD-A148 955/8/GAR PC **A03/MF A01**
Army War Coll., Carlisle Barracks, PA.
Leadership Development in the Civilian Work Force.
Study project,
P. K. Dolezal. 17 May 84, 46p

Within the Department of the Army, as is the case with other Federal agencies and private businesses, there is an increasing concern for the future and the availability of quality leaders to make the transition from the present to the future with maximum benefit. This concern is well-founded and warrants examination with the purpose of establishing the current situation, what is desirable, and a strategy to reduce the distance between two circumstances. The issue of military leadership has been receiving special attention for a period of time now. This study has been conducted to examine the development of military leaders, compare the nature of military leadership vis-a-vis civilian leadership, and to propose a strategy for improving performance in the area of civilian leadership development. An examination of leadership development in two private sector corporations has been done to provide a balance to the issue of military versus civilian leadership. Considerable research into contemporary literature on the subject has been done to gain an appreciation for the many and varied views on leadership, future requirements for leaders, and the feasibility of training leaders.

514,519
AD-A148 974/9/GAR PC **A21/MF A01**
Adjutant General Center, Washington, DC. Administrative Management Directorate.
Pilot of the Modern Army Record-Keeping System (MARKS) at 5th Battalion, 73rd Armored Regiment, 194th Armored Brigade, Fort Knox, Kentucky.
Final rept. 1 Jul 83-30 Jun 84,
J. G. Vos. 1 Aug 84, 497p
Includes microfiche inserts.

This report covers an initial pilot test of a new record-keeping system for the Army which will eventually replace The Army Functional Files System (TAFFS), which was instituted Army-wide in the early 1960's. The new system (Modern Army Record-Keeping System, or MARKS) is subjective, and has as its basis the established and widely recognized numbering scheme for administrative publications. Under MARKS, recorded information is identified and filed by a number which is the same as the basic number of the prescribing directive -- usually an Army Regulation or Department of the Army Pamphlet -- which requires that the information be created, maintained, and used. Other innovations included in the pilot of MARKS were creation of a 'general correspondence' category, inclusion of Privacy Act 'pointers', recording of file number on a document at the time of creation, and amenability to automation through Standard Data Elements and keyword strings. (Author)

514,520
AD-A149 006/9/GAR PC **A18/MF A01**
Office of the Chief of Staff (Army), Washington, DC.
E. C. Meyer, General, United States Army, Chief of Staff, June 1979-June 1983.
1983, 422p

This is a chronological extract from General Edward C. Meyer's term as Chief of Staff of the United States Army from 19 June 1979 to 21 June 1983. The material is drawn from his public record as contained in speech transcripts, annotated drafts, published articles, Congressional testimony, and selected correspondence. The only portion that falls outside these parameters is the initial entry, a single paragraph from his Kermit Roosevelt lectures of early 1979, delivered while he was still a Lieutenant General designated as the next USAREUR Commander. It seems to capture best the thrust of his subsequent four years of service-a focus on enhanced military professionalism. This collection is intended for use in libraries of the war colleges, staff

colleges, service and branch schools-those institutions key to General Meyer's concerns about professional development. The table of contents lists all of his public appearances. Those from which extracts are drawn are in bold face and contain a page reference. The index is another entry into the assembled material.

514,521
AD-A149 019/2/GAR PC **A02**/MF **A01**
Washington Headquarters Services (DoD), DC. Directorate for Information Operations and Reports.
Department of Defense Civilian Manpower Statistics.
Sep 84, 13p Rept no. M04

No abstract available.

514,522
AD-A149 020/0/GAR PC **A02**/MF **A01**
Army War Coll., Carlisle Barracks, PA.
OPMS (Officer Personnel Management System) Mini-Review.
Student essay,
J. F. Connolly. May 84, 22p

The Officer Personnel Management System (OPMS) has been with us for about ten years. From the beginning, OPMS has been more a patchwork quilt than a single piece of cloth. It was designed only to fix those aspects of the then current system (circa 1970) that were perceived to be broken. With a decade of living with the system it seems appropriate to pause and examine its worth. Specifically, does OPMS do what it was designed to do and will it meet the needs of the Army of the future. This is the seminal question confronting the Department of Army, OPMS Study Group. My purpose is to submit ideas in the essay format to the Study Group for their consideration. I plan to explain within the historical context the way we manage, promote and select for command officers of the Regular Army. My overall goal is to see the present system fine-tuned to better serve our Army and our Nation.

514,523
AD-A149 073/9/GAR PC **A02**/MF **A01**
Army War Coll., Carlisle Barracks, PA.
Resource Management: A Prioritization Process.
Student paper,
R. D. Morig. 7 May 84, 19p

Resource managers throughout the Defense Department are required to develop and package the resource requirements for their commands. This process must evaluate many differing proposals and determine those that will compete successfully for limited resources at the next higher headquarters. This constrained environment also results in the closest of scrutiny at all levels to insure the requirements meet the needs of the Defense Department. A methodology is provided which is intuitively and mathematically acceptable that will offer the resource manager a way of packaging and presenting these resource requirements. It is oriented on the goals and objectives of the organization and its higher organization. A weighting process that evaluates the contribution of each initiative to these goals in such a manner that they can be defended under the closest of scrutiny is offered. The methodology is oriented on the Program Analysis and Resource Review (PARR)/ Program Objective Memorandum (POM) process but is also applicable to the budget execution process. (Author)

514,524
AD-A149 089/5/GAR PC **A04**/MF **A01**
Army War Coll., Carlisle Barracks, PA.
Review of the Tri-Service Academy and ROTC Scholarship Manpower Requirements as They Relate to the Decreasing High School Graduate Resource.
Study project,
R. D. Brown. 30 Mar 84, 64p

For many years numerous government agencies have questioned the high attrition rates experienced at the three DOD service academies--West Point, Annapolis and the USAF Academy. Both the external environment and internal atmosphere at each academy have been examined. Since the overall application rates are high and the total pool of young men and women interested in admission continues to rise however, the quality of the applicant pool itself has, to some extent only been superficially examined. This individual research project attempts to review admission requirements for the three DOD service academies and for the three ROTC scholarship programs as they relate to the decreasing high school graduating population. The conclusions recommend further refinement of the data in specific areas where commonality exists.

514,525
AD-A149 090/3/GAR PC **A02**/MF **A01**
Army War Coll., Carlisle Barracks, PA.
Credentialing of Physicians in the Army.
Student essay,
F. N.Bussey. 21 May 84, 25p

Credentialing of physicians is a process to specifically define areas of medical practice to include specific modalities of care which a medical treatment facility (MTF) grants to a physician who applies for practice privileges in that facility. This practice, in some form, has always been carried out in both military and civilian hospitals but has come under closer scrutiny by the public as well as federal and state governmental agencies as part of the overall concern for quality assurance in medical care. Recently the Defense Health Council studied the status of the Credentialing process in the military and made several recommendations for improvement. Although not specifically mentioned in the report, the credentialing process for the Reserve Components is an area of concern to the Army Surgeon General. This paper reflects the current process of credentialing physicians in military MTFs with emphasis on the Army to include the Reserve Components and recommended improvements which have been incorporated in the change to Chapter 9, AR 40-66 Quality Assurance Program, which is presently being staffed prior to final approval by the Department of the Army.

514,526
DE85000167/GAR PC **A04**/MF **A01**
Oak Ridge National Lab., TN.
ORNL (Oak Ridge National Laboratory) Resource Conservation and Reccvery Training Program.
B. D. Barkenbus, and B. M. Eisenhower. Nov 84, 66p ORNL/TM-9060
Contract AC05-84OR21400
Portions are illegible in microfiche products. Original copy available until stock is exhausted.

The Department of Environmental Management (DEM) of the Oak Ridge National Laboratory (ORNL), in compliance with the Resource Conservation and Recovery Act (RCRA) of 1976, initiated an RCRA program and consequently established an RCRA training program for the management of hazardous wastes. This report delineates the objectives, methods, and content of the training program as well as documenting inDividual training received by each staff member under this program. Separate training programs have been devised to meet the needs of four groups: (1) the Hazardous Material Control group, (2) support personnel (Plant and Equipment Division members), (3) Laboratory Environmental Protection Officers, and (4) ORNL research divisions and members of the surrounding community (outreach program). (ERA citation 10:003075)

514,527
DE85000602/GAR PC **A06**/MF **A01**
Wisconsin Univ.-Superior. Center for Lake Superior Environmental Studies.
Energy Awareness: A Comprehensive Approach. Final Report.
D. D. Vaishnav. 29 Feb 84, 118p DOE/ER/10278-T1
Contract FG05-82ER10278
Portions are illegible in microfiche products.

The University of Wisconsin-Superior conducted an intradisciplinary Faculty Development Project during the 1982-1983 year. Twenty-three teachers including 5 women and 18 men from that many schools participated in the project. They attended a 2-week on-campus summer workshop and many also attended the follow-up meeting. The latter was to finalize the plans for introducing Energy Education in participants' high schools. Participants' summer activities consisted of: (1) socials and group dynamics - 6 hrs; (2) laboratory training - 24 hrs; (3) classroom instruction - 18 hrs; (4) field trips - 16 hrs; (5) viewing films in energy and related topics plus listening to the guest speakers - 6 hrs; (6) group discussions for the development of teaching materials in Energy Education - 6 hrs; and (7) taking written examinations - 4 hrs. Those who successfully completed these activities earned 3 quarter graduate credits in a science discipline of choice. Energy Resource Center was created to provide additional information in energy and related areas. The Center displayed multiple copies of over 100 different publications which allowed teachers to compile the materials of their choices and usefulness. In addition, numerous handouts were given during the laboratory and classroom sessions. (ERA citation 10:000856)

514,528
DE85002477/GAR PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Classroom Training Revision Methodology.
R. J. Carter. 1984, 5p CONF-841099-5
Contract AC05-84OR21400
Human Factors Society annual meeting, San Antonio, TX, USA, 22 Oct 1984.

A methodology was described to revise program deficiencies in Army classroom training identified during training effectiveness evaluations. The baseline for its design approach was discussed. The revision methdology's content and structure was presented in detail. (ERA citation 10:004115)

514,529
DE85002559/GAR PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Development of Methods for Nuclear Power Plant Personnel Qualifications and Training.
C. C. Jorgensen, and R. J. Carter. 1984, 10p CONF-8410142-27
Contract AC05-84OR21400
12. water reactor safety research information meeting, Gaithersburg, MD, USA, 23 Oct 1984.

The Nuclear Regulatory Commission (NRC) has proposed additions and revisions to Title 10 of the Code of Federal Regulations, Parts 50 and 55, and to Regulatory Guides 1.8 and 1.149. ORNL is developing methods and some aspects of the technical basis for the implementation and assessment of training programs, personnel qualifications, and simulation facilities. The paper describes the three methodologies which were developed during the FY-1984 research: a task sort procedure (TSORT); a simulation facility evaluation methodology; and a task analysis profiling system. (ERA citation 10:002284)

514,530
DE85003169/GAR PC **A06**/MF **A01**
Brookhaven National Lab., Upton, NY.
Education and Training Plan for the US DOE Office of Classification.
J. J. Cadwell. 1 Oct 84, 110p BNL-35352
Contract AC02-76CH00016
Portions are illegible in microfiche products.

The Office of Classification (OC) requires information and advice on the techniques of training and how these techniques can be used most effectively to impart certain classification information to current and future DOE employees at headquarters. OC is required by law to classify and identify information which must be protected. OC has the responsibility to assure that all newly hired employees are trained and knowledgeable about their legal responsibilities. In addition, OC is responsible for training newly authorized classifiers and for retraining and updating current authorized classifiers. Currently, no objective evaluation is available to the OC to establish what information on classification should be given and which employees should receive this information or how often this information should be imparted. Objective of this task is to provide a plan that will describe steps which OC may take to enhance and improve its education program. The recommendations made in this report suggest the best training methods, techniques, testing, and other matters. (ERA citation 10:002013)

514,531
N85-12885/8/GAR PC **A05**/MF **A01**
Ohio Univ., Athens. Avionics Engineering Center.
Realistic Localizer Courses for Aircraft Instrument Landing Simulators.
Final Report.
T. A. Murphy. May 84, 78p NAS 1.26:172333, OU/AEC/EER-66-1, NASA-CR-172333
Contract NAS1-17368

The realistic instrument landing simulator (ILS) course structures for use in aircraft simulators are described. Software developed for data conversion and translation of ILS course structure measurements and calcomp plots of the courses provided are described. A method of implementing the ILS course structure data in existing aircraft simulators is outlined. A cockpit

used in the lab to review the digitized ILS course structures is displayed.

514,532
N85-12934/4/GAR PC A04/MF A01
Essex Corp., Huntsville, AL.
Design, Fabrication and Delivery of a Spacelab Neutral Buoyancy Instrument Pointing System (IPS) Mockup.
Final Report.
C. N. Vanvalkenburgh. 8 Nov 84, 66p NAS 1.26:171233, NASA-CR-171233
Contract NAS8-35480

Underwater simulations of EVA contingency operations such as manual jettison, payload disconnect, and payload clamp actuation were used to define crew aid needs and mockup peculiarities and characteristics to verify the validity of simulation using the trainer. A set of mockup instrument pointing system tests was conducted and minor modifications and refinements were made. Flight configuration struts were tested and verified to be operable by the flight crew. Tasks involved in developing the following end items are described: IPS gimbal system, payload, and payload clamp assembly; the igloos (volumetric); spacelab pallets, experiments, and hardware; experiment, and hardware; experiment 7; and EVA hand tools, support hardware (handrails and foot restraints). The test plan preparation and test support are also covered.

514,533
N85-13666/1/GAR PC A07/MF A01
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
Project Resources Planning and Control.
C. W. Sibbers. Nov 84, 145p NAS 1.15:86339, NASA-TM-86339

This report contains instructional guidelines for the resources planning and control of research and development (R&D) projects managed by NASA's Langley Research Center (LaRC). Although written to serve primarily as a practical guide and reference for those LaRC personnel who perform resources planning, analysis, control, and reporting functions, it should also be meaningful to other NASA personnel who are directly or indirectly involved in or affected by these functions, especially project technical managers whose responsibilities include resources management. Certain sections should help Contractor personnel to better understand what resources information must usually be submitted on LaRC projects and what use is made of such information. The Project Manager of a large R&D project typicaly receives support from an Analyst in the area of resources management. The Analyst provides assistance in four functional areas: Planning, Analysis/Control, Administration, and Reporting. Each of these functions are discussed in detail. Examples of techniques used effectively on LaRC projects have been included where applicable. A considerable amount of information has been included on the use of Performance Measurement (Earned Value) Systems for contract cost control and reporting as little information is currently available on this subject in NASA publications.

514,534
N85-13667/9/GAR PC A24/MF A01
Technische Univ., Berlin (Germany, F.R.).
Forschungsbericht 1979-1982. Teil 2: Projektteil (Research Report 1979-1982. Part 2: Projects).
J. Hoffmann, and M. Wolff. 1982, 566p ISBN-3-7983-0960-4
Text in German.

A listing of 1735 projects which were carried out or promoted by the Technical University of Berlin between January 1979 and December 1983 is presented.

514,535
PB85-134716/GAR PC A12/MF A01
African-American Inst., New York.
Qualitative Assessment of Selected Regional Training Institutions in West and Central Africa.
C. Wise, and R. Dieterich. 1981, 257p AID-PN-AAM-033

A variety of existing African institutions could be developed for use by A.I.D. in third-country training efforts according to this qualitative assessment of the regional training capabilities of 61 regional and national training institutions in West and Central Africa. An introductory sections discuss an earlier inventory of African training institutions and the present assessment's objectives, organization, and methodology. Demographic trends in education are then outlined and general conclusions about the training capabilities of the sampled institutions presented. Next, the general background, major programs, student population, admissions criteria, curricula strengths, faculty, institutional infrastructure, and financial and budgetary status of 15 institutions are described and recommendations are made for improving their training capabilities. The history of and trends in A.I.D. support of participant training programs in Africa are then reviewed. Appended are copies of the questionnaires used and a list of institutions visited in conducting the assessment.

514,536
PB85-138246/GAR MF A01
International Bank for Reconstruction and Development, Washington, DC.
Los Libros de Texto Gratuitos de Mexico: El Nacionalismo y la Urgencia de Educar (Mexico's Free Textbooks: Nationalism and the Urgency to Educate).
Working paper,
P. H. Neumann, and M. A. Cunningham. c1984, 127p ISBN-0-8213-0368-6, WP-541S
Text in Spanish. See also English version, PB83-247379. Library of Congress catalog card no. 84-7387. Microfiche copies only. Paper copy available from World Bank, 1818 H. St., NW, Washington, DC. 20433.

Mexico has set an example other nations may well wish to emulate. It supplies free textbooks to all its children in the six grades of public and private primary schools. How Government arrived at this decision twenty years ago and how the country mustered the political will and the resources to accomplish its ambitious goal, is described in this Study, written by experts in the field and based largely on Mexican sources. Textbooks often are the most cost effective means to upgrade academic achievement and increase the effectiveness of a school system. Good textbooks continue to be in short supply in most LDCs. The Study suggests ways to remedy this situation.

514,537
PB85-143733/GAR PC E08/MF E08
Sussex Univ., Brighton (England). Science Policy Research Unit.
Technical Change in a Newly Industrializing Country: A Case Study of the Impacts on Employment and Skills in the Brazilian Textiles Industry.
Occasional paper series,
L. Acero. Jan 84, 156p SPRU/OP/SER-22, ISBN-0-903622-23-8

This paper explores the effects of technical change on labor use. It analyses the consequences upon the number and nature of jobs, the skill requirements in the labor force, the sexual division of labor, and the practices of recruitment, training and promotion implemented by a large Brazilian textile firm. These are presented in the context of the policy measures introduced to facilitate the modernization of Brazilian textiles.

514,538
PB85-144806/GAR PC A09/MF A01
Office of Personnel Management, Washington, DC. Office of Training and Development.
Determining the Need for Training: A Collection of Federal Agency Needs Assessment Practices.
R. Salinger, and R. Kletnick. 1984, 198p OPM/WDG-85/1, WDG-200
Prepared in cooperation with Maryland Univ., College Park.

A survey was made of Federal government agencies, in order to find and document methods for determining the need for employee training. Seven examples of agency needs assessment practices are described, including samples of data collection forms; plans and timetables for carrying out surveys; and resulting needs assessment reports. References are given to agency personnel responsible for needs assessments. A general overview of training needs assessment and a briefly annotated bibliography are also included. The agency needs assessment approaches include the following kinds of efforts: A periodic organization-wide survey to determine priorities for centrally-administered training; an annual process to identify headquarters and regional needs, with trainers in the role of consultants; use of master performers to define the nature of the job and, ultimately, the training required; training committees formed by job area and composed primarily of managers; an inventory to assess management development needs; multiple-step organizational and job analyses to identify training and other needed actions for performance improvement.

514,539
PB85-146702/GAR PC A14/MF A01
Mathematica Policy Research, Inc., Princeton, NJ.
Process and Implementation Issues in the Design and Conduct of Programs to Aid the Reemployment of Dislocated Workers.
W. Corson, R. Maynard, and J. Wichita. 30 Oct 84, 321p R-7552-07
Contract DL-99-3-0805-77-066-01

The Department of Labor awarded grants to organizations in six areas to implement one-year demonstration programs during the 1983 federal fiscal year aimed at assisting the readjustment of dislocated workers. These areas were Alameda County, CA; Buffalo, NY; Lehigh Valley, PA; Mid-Willamette Valley, OR; Milwaukee, WI; and Yakima, WA. This report addresses issues pertaining to the operational feasibility and programmatic outcomes of alternative replicable approaches for providing employment-related services to dislocated workers. Among the findings and recommendations presented in the report are the following: (1) programs should target their services toward workers in declining industries and not necessarily limit their services to workers from specific plants; (2) the services offered should include job-search assistance, job development, and retraining; (3) training areas, providers, and recipients must be selected with great care to ensure that the trainees have the ability and aptitude to complete training, that the training is competently delivered at reasonable cost, and that employment opportunities are available for completers; (4) a case management approach to service delivery tends to improve performance; (5) the average cost per participant of providing a comprehensive set of job-search-assistance services was about $700, on-the-job training was about $1,400, and classroom training was about $2,000; and finally (6) placement rates ranged from 30 to 80 percent in the demonstration sites.

514,540
PB85-855112/GAR PC N01/MF N01
National Technical Information Service, Springfield, VA.
Computer Aided Instruction. 1982-February 1985 (Citations from the NTIS Data Base).
Rept. for 1982-Feb 85.
Feb 85, 333p
Supersedes PB83-804641.

This bibliography contains citations concerning the utilization of computers in education and training. Topics include guidelines and system requirements, classroom instruction, specific educational program descriptions, and motivational aspects. System cost effectiveness, and the viewpoints of school administrators and teachers are also considered. Considerable attention is given to military training applications, including the use of simulation graphics. (This updated bibliography contains 344 citations, 222 of which are new entries to the previous edition.)

5J. Psychology (Individual and Group Behavior)

514,541
AD-A148 849/3/GAR PC A07/MF A01
Army Natick Research and Development Center, MA.
Psychophysical Bases for the Sensory Assessment of Rations.
Final rept.,
A. Cardello, and O. Maller. Apr 84, 141p Rept no. NATICK/TR-84/015

Development of acceptable and nutritious rations requires the judicious use of sensory evaluation techniques. An appreciation of the philosophical, historical and mathematical bases of these methods is necessary for their successful application. This report traces the origins of the methods and delineates the methods that are available for the sensory analysis of foods, rations and beverages.

514,542
AD-A148 907/9/GAR PC A03/MF A01

Maryland Univ., College Park. Dept. of Psychology.
Employee and Customer Perceptions of Service in Banks: Replication and Extension.
Technical rept.,
B. Schneider, and D. E. Bowen. Oct 84, 36p Rept no. RR-84-1
Contract N00014-83-K-0551

Survey data from 142 employees and 968 customers from 28 branches of a bank were analyzed with the following results: (1) Moderate support was found for previous work on correlates of role stress for boundary role employees and good support was found for relationships between branch employees' and branch customers' service perceptions and attitudes; (2) Some significant relationships were reported between branch employees' perceptions of organizational human resources practices and branch customers' attitudes about service; and (3) employee attitudes and customer attitudes were related to their own and one another's turnover intentions. Results were discussed from the perspective of promoting an integration of consumer and organizational behavior in the service sector.

514,543
AD-A148 910/3/GAR PC **A03/MF A01**
Ptog Research, Inc., Reseda, CA.
Training Objectives for Tank Platoon Leaders: A Focus Group Evaluation.
Research rept. Dec 82-Dec 83,
H. J. Zagorski, and K. M. Travis. Feb 84, 30p ARI-RR-1365
Contract MDA903-83-C-0018

Focus group research was conducted to evaluate a new format for preparing Army training objectives for tactical leadership tasks. A second objective was concerned with the approach to be taken in extending this format to include training standards for use in after-action reviews. Twelve groups of Army personnel knowledgeable in tactical leadership were interviewed. The new format was perceived as potentially useful in tactical leadership training. Alternatives regarding the extension of the format to include training standards were provided by the participants. (Author).

514,544
AD-A148 934/3/GAR PC **A04/MF A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH.
Effects of Tempo and Intensity on Hyperactive Children.
Doctoral thesis,
S. L. Shively. Aug 84, 64p Rept no. AFIT/CI/NR-84-91D

This study examined the cognitive and behavioral effects of auditory stimulation on hyperactive children. Thirty-two male Caucasian boys, ranging in age from six to fourteen were randomly assigned to one of four treatment conditions. Treatment conditions consisted of listening to music that varied according to intensity (high and low) and tempo (fast and slow). The four combinations of music were high and fast, high and slow, low and fast, and low and slow. The subjects performed a cognitive task during the assigned treatment condition and also during a no-music condition. Behavioral observations and ratings were also taken during these conditions in the early part of the study. Analysis of variance showed no significant differences in either the music/no-music conditions or as a result of the specific variables of tempo and intensity. Results of the study do not support the under arousal theory as an explanation for hyperactivity or the stimulation approach as viable treatment technique. (Author).

514,545
AD-A148 989/7/GAR PC **A02/MF A01**
Massachusetts Inst. of Tech., Cambridge. Artificial Intelligence Lab.
Selecting One Among the Many: A Simple Network Implementing Shifts in Selective Visual Attention.
Memorandum rept.,
C. Koch, and S. Ullman. Jan 84, 21p Rept no. AI-M-770
Contract N00014-80-C-0505

This study addresses the question of how simple networks can account for a variety of phenomena associated with the shift of a specialized processing focus across the visual scene. We address in particular aspects of the dichotomy between the preattentive-parallel and the attentive-serial modes of visual perception and their hypothetical neuronal implementations. Specifically, we propose the following; (1) A number of elementary features, such as color, orientation, direction of movement, disparity etc. are represented in parallel in different topographical maps, called the early representation. (2) There exists a selective mapping from this early representation into a more central representation, such that at any instant the central representation contains the properties of only a single location in the visual scene, the selected location. (3) We discuss some selection rules that determine which location will be mapped into the central representation. The major rule, using the saliency or conspicuity of locations in the early representation, is implemented using a so-called Winner-Take-All network. A hierarchical pyramid-like architecture is proposed for this network. We suggest possible implementations in neuronal hardwre, including a possible role for the extensive back-projection from the cortex to the LGN.

514,546
AD-A149 081/2/GAR PC **A04/MF A01**
Texas A and M Univ., College Station. Dept. of Management.
Objective and Social Factors as Determinants of Task Perceptions and Responses: An Integrative Framework and Empirical Investigation.
Technical rept.,
R. Griffin, T. Bateman, S. Wayne, and T. Head. Nov 84, 62p Rept no. TR-ONR-DG-09

The purpose of this study was to test the relative efficacy of the task attributes model of task design, the social information processing model of task design, and an integrated framework derived from the two. A complex laboratory study manipulating objective task properties, social information, and changes in both objective task properties and social information was conducted to test the three models. Results suggested moderate support for the social information processing model, strong support for the task attributes model, and the strongest support for the integrated framework. Implications for future theory and research are discussed.

514,547
AD-A149 096/0/GAR PC **A07/MF A01**
Texas Univ. at Austin.
Leadership: Structural and Functional Aspects.
Master's thesis,
D. E. Morse. Dec 84, 129p

This study will develop a conceptual model of leadership based on an analysis of leadership functions. In broad outline, I will argue that an essential function of a leader is to develop and maintain social bonds among group members. In fact, I will conclude that this is a function of paramount importance, which has been neglected by most research. I will argue that analysis of the bond-building function can provide significant insight into the nature of leadership, regardless of context. The specific features of social bonds and how they are developed and maintained will vary in different groups and situations, but an essential leadership function in every case will be their development and maintenance. Such a model would be readily open to empirical confirmation, would provide theoretical insights into leadership processes within groups, and would have useful practical consequences for leadership development and training as well.

514,548
PB85-138436/GAR PC **E03/MF E03**
Transport and Road Research Lab., Crowthorne (England).
Drinking and Driving Habits, Attitudes, and Behaviour of Male Motorists.
Supplementary rept.,
A. B. Clayton, P. E. McCarthy, and J. M. Breen.
c1984, 22p TRRL/SR-826
Prepared in cooperation with Birmingham Univ. (England). Dept. of Transportation and Environmental Planning.

Interviews were undertaken with a group of male motorists in Birmingham who had not been convicted of a drink/driving offence during the previous ten years. Data were obtained on drinking and drink/driving experience as well as knowledge of and attitudes towards drinking and driving and the law. Wide differences were obtained between the amounts of alcohol motorists believed that they could consume in two hours and remain below the prescribed limit and the amounts they could drink and still consider that they were fit to drive.

5K. Sociology

514,549
PB85-136661/GAR PC **A03/MF A01**
Agency for International Development, Washington, DC.
Women in Development.
Policy paper.
Oct 82, 48p AID-PN-AAL-777
Portions of this document are not fully legible.

This policy paper demonstrates how LDC women's concerns are to be integrated into AID's program. Other policy papers recognize various roles LDC women play. For example, the Food and Agriculture paper highlights women as agricultural producers, farm laborers and family food providers, and recommends an expansion of their opportunities in the food-related and agriculture fields. The Water and Sanitation paper recognizes women's stake in the provision of clean water and sanitation for the community. The Nutrition paper points out that since women's income is most likely to go toward food for her family, improving nutrition through increased income generation should focus on women. The Private Enterprise paper establishes four priorities for AID's investment (agriculture, agribusiness, small scale industries and private sector service enterprises), all of which are important areas for women's involvement. But, unlike most of AID's policy statements, the Women in Development Policy is cross-sectoral; it is meant to provide the policy framework and overall practical guidance for each sector and for the Agency as a whole in its efforts to incorporate women into the total development process.

514,550
PB85-138030/GAR PC **A02/MF A01**
World Fertility Survey, London (England).
Sudan Fertility Survey, 1979: A Summary of Findings.
World Fertility Survey no. 36.
Apr 82, 21p AID-PN-AAL-750
Contract AID/CSD-3606
Sponsored by International Statistical Inst., Voorburg (Netherlands), and United Nations Fund for Population Activities, New York.

In the recent past, there has been little or no change in Sudan's relatively high fertility rate of 6.9 births per woman. So concludes this report, summarizing the findings of the 1979 Sudan Fertility Survey. After describing the setting of the survey and its design and sample, the report presents major findings in regard to general population characteristics, nuptiality, fertility, mortality, family size preferences, family planning, and non-contraceptive factors affecting fertility. Policy implications of the findings are considered briefly.

514,551
PB85-140119/GAR PC **A02/MF A01**
North Carolina Univ. at Chapel Hill. Labs. for Population Statistics.
Tendencias Recentes na Metodologia de Levantamentos Demograficos em Paises em Desenvolvimento (Recent Methodological Trends in Demographic Investigation in Developing Countries),
A. L. Adiakha, J. M. Sullivan, and J. R. Abernathy.
Jun 81, 24p SCIENTIFIC SER-33A, AID-PN-AAL-155
Contract AID/DSPE-C-0025
Text in Spanish.

In recent decades, considerable progress has been made in refining direct and indirect methodologies for estimating vital statistics. This report summarizes these advances and critically examines their applicability to the collection of demographic data in developing countries. Each of three methodologies for direct collection of data - interviews with one person, or with more than one person, or collection of information from more than one source (e.g., from both civil registers and house visits) - is weighed for its respective advantages and disadvantages. The advantages and drawbacks of four methodologies for the more rapidly accomplished indirect collection of data and the use of statistical modeling to calculate infant mortality from statistics on infant survival are also discussed.

514,552
PB85-140192/GAR PC **A04/MF A01**
Agency for International Development, Washington, DC. Office of Evaluation.

Private Sector: Ethnicity, Individual Initiative, and Economic Growth in an African Plural Society. The Bamileke of Cameroon.
Special study,
H. M. McFerson. Jun 83, 75p AID EVALUATION SS-15, AID-PN-AAL-016

Of the more than 200 ethnic groups in Cameroon, the Bamileke appear to be the most economically successful. Reasons for their success are analyzed in this study of traditional Bamileke culture and its adaptation to contemporary economic conditions. Unlike most other African ethnic groups, traditional Bamileke society provided avenues of upward mobility to everyone, with improvement of status through hard work and individual initiative. Emphasis was and is on competition in work, effort, savings, and economic improvement, and on frugality rather than emulative consumption. Individuals are expected to make their own way in the world while retaining a strong ethnic identity and contributing to the group.

514,553
PB85-140572/GAR PC **A05/MF A01**
Agency for International Development, Washington, DC. Office of Evaluation.
Food Aid and Development: The Impact and Effectiveness of Bilateral PL 480 Title 1-Type Assistance.
Discussion paper,
E. J. Clay, and H. W. Singer. Dec 82, 96p AID PROGRAM EVALUATION DP-15, AID-PN-AAL-003
Prepared in cooperation with Sussex Univ., Brighton (England). Inst. of Development Studies.

Food aid programs operate today within the contexts of priority for the relatively poorest countries, a multiplicity of food donors, tighter food markets, restrictive host country financial regimes, and an increasing focus on food aid's developmental potential. This report surveys existing literature on the nearly 30-year-old P.L. 480 program to assess the direct and developmental impacts of program food aid (Titles I and III) on recipient countries. An analysis of the direct impact of Title I programs discusses why food aid may be an inferior form of resource transfer, investigates the food import problems of low-income countries and the relation between food aid and food security, and evaluates the use of food aid as balance of payments support. The developmental impact of food aid is discussed next, with special attention given to its incentive and disincentive effects; the role of changing tastes; the impact of food aid on government policies, nutrition, income distribution, and production technology; and the results of targeting poorer groups.

514,554
PB85-141828/GAR PC **A04/MF A01**
International Statistical Inst., Voorburg (Netherlands).
Comparative Studies. Cross National Summaries Number 14: Family Size Preferences,
R. E. Lightbourne, and A. L. MacDonald. Nov 82, 61p AID-PN-AAL-973
Contract AID/CSD-3606
Sponsored by World Fertility Survey, London (England).

Fertility preference data for 19 countries participating in the World Fertility Survey (WFS) are presented in this report. After discussing some of the difficulties inherent in the concept of preferred family size (including rationalization effects), the report summarizes the WFS fertility preference questions and lists five variables for which tabulations were calculated - total number of children desired, wanted family size, whether last birth desired, whether more children desired, and if so, how many. These variables are then defined and sources of non-comparability among countries, along with problems in translation, survey response, and other methodological issues, are discussed. Next, outstanding WFS findings on fertility preference are highlighted; crossnational regularities are noted and alternative interpretations examined. A final section notes that the data imply that although fertility would decline substantially in many countries if women acted consistent to their stated fertility preferences, very low population growth rates could be achieved only if the preferences themselves were markedly lower.

514,555
PB85-141844/GAR PC **A03/MF A01**
World Fertility Survey, London (England).
Evaluation of Birth Histories: A Case Study of Kenya.
World Fertility Survey no. 36,
R. A. Henin, A. Korten, and L. H. Werner. Oct 82, 34p AID-PN-AAL-976
Sponsored by International Statistical Inst., Voorburg (Netherlands).

Fertility rates in Kenya remain high, but the country may be entering a transition period to lower rates. Thus concludes this report, which analyzes birth history data collected in the 1977-8 Kenya Fertility Survey (KFS) in conjunction with fertility estimates from the 1962 and 1969 censuses and the 1977 National Demographic Survey. First, data from all four sources are compared, showing an apparent increase in fertility over the period 1962-78. Next, birth history data from the KFS are evaluated with respect to possible reporting errors and the effects of education. Finally, fertility estimates calculated by cohort and time and by province using the Brass P/F model and the Gompertz relational model are presented to clarify results noted in the first two sections.

514,556
PB85-143063/GAR PC **A04/MF A01**
Agency for International Development, Washington, DC.
Housing and Health: An Analysis for Use in the Planning, Design, and Evaluation of Low-Income Housing Programs.
Nov 81, 75p AID-PN-AAL-854

To establish a framework to monitor the health effects of A.I.D.'s Housing Guaranty program, existing literature on the health effects of low-income housing solutions in developing countries is reviewed in this report. A major finding is that in the absence of other improvements in the socioeconomic status of residents, housing by itself may not significantly affect health status. An introductory section defines the terms health and housing and provides generalizations about their interrelationship. Discussion is then given to the connection between specific planning and design characteristics and specific diseases and pathological conditions. The discussion covers water, sanitation, and excreta removal facilities; general housing standards (space, temperature, ventilation, and illumination); food preparation and household storage; construction materials; home gardens and livestock raising; the physical planning of immediate surroundings; and general land-use planning. Priority linkages in the housing/health domain are explored next, followed by an assessment of the Housing Guaranty program and a strategy to evaluate the relationship between housing and health. A case study of a home garden as a health-related housing intervention concludes the report.

514,557
PB85-143121/GAR PC **A12/MF A01**
Checchi and Co., Washington, DC.
Mauritania: Rural Assessment and Manpower Surveys. Studies in Social Change. Population Movements and Migrations in Mauritania.
Jul 80, 254p AID-PN-AAM-226
Contract AID/afr-C-1489
Sponsored by Berger (Louis) International, Inc., East Orange, NJ., and Action Programs International, Santa Monica, CA.

From time immemorial, Mauritania's ethnic groups have been involved in important population migrations. But, as this study shows, during the last few decades this mobility has intensified and has taken on a new character. In former times population movements were an integral part of the pastoral, and to a certain extent, the agricultural lifestyle. During the later colonial period, populations also began to migrate for economic reasons, and the drift toward urban areas began. This drift, exacerbated by the Sahelian drought, the creation of a wage sector in Mauritania, and the devaluation of rural work and rural products, continues to the present time. After reviewing the history of migration in Mauritania, and the economic and social conditions motivating today's population movements (which are primarily labor migrations), the authors of the study examine the negative impacts of these labor migrations on Moorish and Black African (Toucouleur and Soninke) societies, showing that their lifestyles have been radically transformed, e.g., herdsmen have been made sedentary and migrant groups urbanized. A final section discusses migrations to other African countries and to Europe.

514,558
PB85-143774/GAR PC **A03/MF A01**
RAND Corp., Santa Monica, CA.
Birthspacing, Fertility, and Family Planning: Policy and Program Implications from the Malaysian Family Life Survey,
J. DaVanzo, and W. P. Butz. Nov 81, 29p R-2925-AID, ISBN-0-8330-0429-8, AID-PN-AAL-978
Grant AID/OTR-G-1822

During the past 20 years, an active family planning program has helped Malaysia reduce its overall fertility rate, although unevenly across the various ethnic and other segments of society. This report discusses the findings of the 1976-77 Malaysian Family Life Survey on factors contributing to this decline and the implications of these findings for future family planning and related programs. After outlining the survey's conceptual framework and data gathering methods, trends in birthspacing, breastfeeding, and contraceptive use evident from the survey are examined. The remainder of the report focuses on the practical implications of these trends for health and family planning programs and policies, for socioeconomic policies, and for future fertility research.

514,559
PB85-144665/GAR PC **A11/MF A01**
Oklahoma Conservation Commission, Oklahoma City.
Archeological Testing Work, Multi-Purpose Impoundment 4M, Robinson Creek Watershed, Lincoln County, Oklahoma.
Archeological research rept. no. 9,
C. S. Wallis. Jan 83, 229p OCC-ARR-9
Sponsored by Soil Conservation Service, Stillwater, OK.

During August and September, 1981, test excavations were conducted at archaeological sites 34Ln-18, 34Ln-76 and 34Ln-78 in order to evaluate their potential eligibility for inclusion on the National Register of Historic Places. Limited excavations at 34Ln-18 showed that the cultural remains at this prehistoric camp and early 1900 historic farmstead site were badly disturbed. One surface depression proved to be the remains of a cellar. Site 34Ln-76 proved to have two stratigraphically separable components affiliated with the Plains Woodland (A.D. 830-870) and Plains Village (A.D. 1240-1300) periods. As a result of the 1981 testing program, site 34Ln-76 has been declared eligible for inclusion on the National Register of Historic Places.

514,560
PB85-144848 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Surveillance Receiver/Recorders.
Final rept.,
J. F. Shafer, and H. E. Taggart. Jun 84, 17p
Sponsored by National Inst. of Justice, Washington, DC.
Pub. in NIJ (National Inst. of Justice) Report-0222.00, 17p Jun 84.

The standard establishes performance requirements and methods of test for one type of receiving and recording system used for audio surveillance by the law enforcement community. The document lists the principal terms and definitions needed, as well as the most critical items of required test equipment. The standard addresses typical frequency-modulated receivers and tape recorders that use a 4.76 cm/s (1 7/8 in/s) Philips-type cassette. Characteristics measured include receiver sensitivity and selectivity, squelch sensitivity, audio distortion and response, tape speed tolerance and memory retention.

514,561
PB85-145829/GAR PC **A07/MF A01**
American Public Welfare Association, Washington, DC.
Analyze and Make Recommendations on Information and Assistance Needs and Resources from the Perspective of the Medicaid Agencies.
Final rept. Jun 83-Apr 84,
T. Tatara. Jun 84, 126p
Grant HCFA-18-98220

Forty out of 55 jurisdictions administering the Medicaid program responded to a survey prioritizing their information and technical assistance needs and commented on the resources available to them. State Medicaid directors would like information and technical assistance that will assist them in containing program costs, improving program efficiency and integrity, avoiding costly sanctions and penalties, and understanding and

implementing Federal regulations. The most important information and assistance needs were identified to be Medicaid Federal Regulations, Diagnosis Related Groups and Home and Community Based Waivers. The three most frequently used sources of information and assistance were HCFA Regional Offices, Commerce Clearinghouse and the Federal Register. Problem areas identified by State and Federal agency staff included: inconsistent policy and policy interpretations; inadequate program planning, inadequate or non-existent training for Regional office staff and State Medicaid directors, and widely varying perceptions of State and Federal roles and responsibilities from one region to another.

514,562

PB85-148484/GAR PC **A06/MF A01**
Department of Education, Washington, DC.
Benefits of Early Intervention for Special Children,
P. W. Bailey, and P. L. Trohanis. Jul 84, 107p

The early intervention program is a program that serves young special children exist throughout the country. One of the primary federal funding sources for demonstration projects aimed at developing more and better services has been the Handicapped Children's Early Education Program (HCEEP). Part B of this section contains brief descriptions of current HCEEP programs endorsed by the Department of Education's Joint Dissemination Review Panel (JDRP).

514,563

SHR-0011823/GAR PC **A16/MF A01**
Wisconsin Univ.-Milwaukee. School of Social Welfare.
Adolescent Pregnancy and Childbearing: Findings from Research,
C. S. Chilman. Dec 80, 351p NIH-PUB-81-2077

Conference papers reviewing the causes and consequences of adolescent sexuality, contraceptive, and fertility behavior are presented. The solution to the problem of teenage pregnancy will not be solved by further promotion of contraception and abortion. The direction of restructuring the institutional system governing male - female relations at young ages provides more answers. The males would receive more recognition of their role in the reproductive cycle and thus more responsibility for their behavior. A corresponding increase placed on the parents would tend to rehabilitate the family. The papers review trends in teenage childbearing; the sexual and contraceptive experiences of young, unmarried women; a reconceptualization of adolescent sexuality; the social, psychological, health, demographic, and economic consequences of teenage pregnancy and parenting; and, the problems of teenage illegitimacy.

6. BIOLOGICAL AND MEDICAL SCIENCES

6A. Biochemistry

514,564

AD-A148 991/3/GAR PC **A02/MF A01**
Walter Reed Army Inst. of Research, Washington, DC.
Analysis of Creatine Phosphokinase in the Mucosa and the Muscularis of the Gastrointestinal Tract,
G. M. Graeber, P. J. Cafferty, R. E. Wolf, and J. W. Harmon. 1984, 9p
Pub. in Jnl. of Surgical Research, v37 p376-382 1984.

No abstract available.

6B. Bioengineering

514,565

PAT-APPL-6-658 945/GAR PC **A02/MF A01**
Department of the Army, Washington, DC.
Polyactic-Polyglycolic Acid Copolymer Combined with Decalcified Freeze-Dried Bone for Use as a Bone Repair Material.
Patent Application,
J. P. Schmitz. Filed 9 Oct 84, 17p AD-D011 438/9
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A novel bone repair material consisting essential of decalcified freeze-dried bone and biodegradable, biocompatible compolymer has been developed for improving and accelerating the healing of osseous tissue. The bone repair material was prepared by combining decalcified bone with a copolymer consisting essentially of a 50:50 poly(L)(-)lactide co-glycolide.

514,566

PB85-147924 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Calibration of Flat 60-Hz Electric Field Probes.
Final rept.,
M. Misakian. 1984, 4p
Sponsored by Department of Energy, Washington, DC.
Pub. in Bioelectromagnetics 5, n4 p447-450 1984.

The influence of nearby ground planes, perturbation of surface charge distributions, and fringing fields on the electric field between parallel plates are characterized to define a parallel plate system that can be used to calibrate flat 60-Hz electric field probes.

6C. Biology

514,567

AD-A148 874/1/GAR PC **A02/MF A01**
School of Aerospace Medicine, Brooks AFB, TX.
Amphibian Chromomycosis,
R. E. Schmidt. 1984, 14p Rept no. USAFSAM-TR-79-237
Pub. in Diseases of Amphibians and Reptiles, p169-181 1984.

No abstract available.

514,568

DE84013035/GAR PC **A04/MF A01**
Solar Energy Research Inst., Golden, CO.
Microalgae Culture Collection, 1984-1985.
Sep 84, 62p SERI/SP-231-2486
Contract AC02-83CH10093

This is a catalog of the 12 microalgae species available from SERI. A major emphasis of the culture collection is to make available most of the existing scientific and culture data for each strain in the collection. Each strain is listed in the catalog with a summary of its most important physiological and culture characteristics. (ERA citation 10:002107)

514,569

DE85000785/GAR PC **A03/MF A01**
Bonneville Power Administration, Portland, OR. Office of Power and Resources Management.
Environmental Assessment on Construction of the Cabinet Gorge Kokanee Hatchery.
Oct 84, 26p DOE/EA-0245
Portions are illegible in microfiche products. Original copy available until stock is exhausted.

Bonneville Power Administration, the Washington Water Power Company, and Idaho Department of Fish and Game plan to enter into a cooperative cost-sharing agreement for the design, construction, operation, and maintenance of a kokanee hatchery in northern Idaho. The proposed hatchery shall supplement mitigation of adverse federal and non-federal hydroelectric and nonhydroelectric impacts. Hydroelectric impacts were primarily degradation of the Lake Pend Oreille shoreline kokanee habitat and blockage of migrating Clark Fork River kokanee. The introduction and establishment of Mysis relicta, the opossum shrimp, created further adverse effects on the kokanee fishery. The proposed hatchery will produce 20 million advanced-stage kokanee fry which will restore the Lake Pend Oreille kokanee fishery level to 744,000 harvestable adults after the first 5 years of operation. 6 references, 4 figures. (ERA citation 10:003372)

514,570

DE85000918/GAR PC **A02/MF A01**
Bonneville Power Administration, Portland, OR. Office of Power and Resources Management.
Environmental Assessment on Construction of the Minthorn Springs Creek Juvenile Acclimation and Adult Holding Facility.
Sep 84, 21p DOE/EA-0243

One of the factors which adversely affect the number of summer steelhead annually returning to the waters within the Umatilla Reservation boundaries is the mortality of adult and juvenile fish resulting from operation of 3 mainstream Columbia River dams (John Day, The Dalles, and Bonneville dams). To enhance the summer steelhead run of the Umatilla River Basin, Bonneville Power Administration proposes to fund the construction and operation of a low-cost, low-technology acclimation facility. The proposed facility would be built, operated, and maintained by the Confederated Tribes in cooperation with the ODF and W. This on-reservation facility would be used to: (1) acclimate and imprint about 150,000 juvenile summer steelhead per year to the Minthorn water characteristics so as adults they will return to this facility; and (2) collect returning adult fish for spawning. Eggs taken from the returning adults would perpetuate the acclimation facility's operation. All adult fish collected would be utilized by the Umatilla people. 7 references, 3 figures. (ERA citation 10:003371)

514,571

DE85002155/GAR PC **A19/MF A01**
Battelle Pacific Northwest Labs., Richland, WA.
Use of Capture Data to Quantify Change and Test for Effects on the Abundance of Wild Populations.
J. R. Skalski. Sep 84, 431p PNL-SA-12662
Contract AC06-76RL01830
Thesis. Submitted to Cornell Univ., Ithaca, NY.
Portions are illegible in microfiche products.

Two new abundance estimators for multi-plot population studies are presented. One census model permits animal abundance estimation with as few as 4 trapping periods. The other census model estimates the areal mean abundance among a series of animal populations while providing measures of spatial heterogeneity and the catch-effort relationship. Statistical tests of treatment hypotheses were developed for manipulative experiments. The nature of the test statistics was dependent upon the type and performance of the abundance estimators used in the surveys. The appropriate data transform depends on the type of census technique (a logarithmic transform for tag-recapture and an inverse transform for removal sampling). Simulation studies indicate a 20% increase in the power of tests when proper data transformation is used. When homogeneity is assumed, indices of abundance rather than estimates of absolute abundance form the basis of the statistical tests. Tests of homogeneity are presented for tag-recapture and removal sampling techniques. Assumption of homogeneity when valid increases the power of tests 2 to 20 times. An odd's ratio design is presented which pairs control and treatment sites using abundance estimates prior to and after the treatment application. The observations from each control-treatment pair are used to estimate a contrast for a time-by-treatment interaction which has an expected value of zero. For equal levels of replication, the odd's ratio design improves power over simple paired designs. However, when costs are considered, sample paired designs are more efficient. The advantage of the odd's ratio design is it assesses effects when treatments cannot be randomized to the replicate study plots. (ERA citation 10:003381)

514,572

PAT-APPL-6-657 630/GAR PC **A03/MF A01**
National Institutes of Health, Bethesda, MD.
Immortal Line of Human Fetal Glial Cells.
Patent Application,
E. O. Major. Filed 4 Oct 84, 36p PB85-143824
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The present invention is directed to permanent establishment of an immortal line of human fetal glial cells, more particularly of glial cells which inter alia, support JC virus multiplication.

514,573
PB85-144111/GAR PC **A02/MF A01**
Corvallis Environmental Research Lab., OR.
Effects of Copper, Nickel and Zinc on the Life Cycle of the Caddisfly 'Clistoronia magnifica' (Limnephilidae).
Journal article,
A. V. Nebeker, C. Savonen, R. J. Baker, and J. K. McCrady. 1984, 7p EPA/600/J-84/185
Pub. in Environmental Toxicology and Chemistry, v3 p645-649 Oct/Dec 84.

The caddisfly Clistoronia magnifica (Limnephilidae) was exposed to copper, nickel and zinc in life cycle tests. The copper test included continuous exposure of first generation aquatic larvae and pupae, second generation larvae and pupae and third generation larvae. The aerial adults and eggs were exposed only to body burdens obtained as larvae and pupae. Nickel and zinc tests included first and second generation exposure. Copper concentrations of greater than 17 micrograms/l prevented completion of the life cycle, and significant reduction in adult emergence occurred at 13.0 micrograms/l. The no-observed-effect level for copper was 8.3 micrograms/l. Nickel concentrations of greater than 250 micrograms/l prevented completion of the life cycle. The no-observed-effect level for nickel was 66 micrograms/l.

514,574
PB85-144129/GAR PC **A02/MF A01**
Corvallis Environmental Research Lab., OR.
Effect of Pentachlorophenol on the Growth and Mortality of Embryonic and Juvenile Steelhead Trout.
Journal article,
S. E. Dominguez, and G. A. Chapman. 1984, 7p EPA/600/J-84/183
Pub. in Archieve of Environmental Contamination and Toxicology 13, p739-743 Nov 84.

The toxicity of sodium pentachlorophenate to early life stages of steelhead trout (Salmo gairdneri) was investigated, using a flow-through exposure system. A 96-hr LC50 of 66 micrograms/l was derived for previously unexposed ten-week-old fry. A 72-day test, beginning 24 hr after fertilization, yielded a chronic toxicity threshold of 14 micrograms/l. These results, and the acute/chronic ratio of 4.7, compare reasonably well with values in the literature. Yolk sac edema and cranial malformations, which are commonly observed in chronic tests with technical grade pentachlorophenol, were rate in this test with purified (99%) material.

514,575
PB85-144558/GAR PC **A06/MF A01**
Checchi and Co., Washington, DC.
Mauritania: Rural Assessment and Manpower Surveys. Inland Fisheries.
1981, 121p AID-PN-AAM-184
Contract AID/afr-C-1489
Sponsored by Berger (Louis) International Inc., East Orange, NJ., and Action Programs International, Santa Monica, CA.

Mauritania's extremely arid climate and high soil permeability limit inland fishing to the country's southern area. This report analyzes the most important Mauritanian fisheries, those located along the Senegal River. Analyses of the ecosystem's production potential, actual fish production, and fish demand shows that: potential catch depends on rainfall; fishermen are competent and well-equipped, with actual catches equaling potential catches; and the high demand for fish leads to overfishing and, during years of low rainfall, market shortages. It is noted further that hydraulic development projects planned for the Senegal River Basin will upset the delicate ecological balance.

514,576
PB85-144590/GAR PC **A06/MF A01**
Checchi and Co., Washington, DC.
Mauritania: Rural Assessment and Manpower Surveys. Traditional Maritime Fisheries.
1981, 121p AID-PN-AAM-185
Contract AID/afr-C-1489
Sponsored by Berger (Louis) International, Inc., East Orange, NJ., and Action Programs International, Santa Monica, CA.

The Sahelian drought drastically reduced the number of fish in Mauritania's rivers and thus created a growing, potential market for the country's underdeveloped maritime fishing subsector. This study describes the present state of the subsector and outlines general policy guidelines to increase maritime fishing and supply inland markets. Maritime fishing zones and their resources (species of fish and their spawning patterns) are described, along with the characteristics of the fishermen and their organization. Production in the subsector is analyzed with regard to the types of fishing boats employed.

514,577
PB85-855179/GAR PC **N01/MF N01**
National Technical Information Service, Springfield, VA.
Genetic Engineering: Plasmids. 1970-February 1985 (Citations from the U. S. Patent Data Base).
Rept. for 1970-Feb 85.
Feb 85, 56p

This bibliography contains citations of selected patents concerning production methods, and utilization of plasmids in recombinant DNA work. Applications of plasmids as cloning vehicles for introducing genetic capabilities into microorganisms are presented. Genetic reagents and techniques for generating plasmids, processes for stabilizing plasmids and the microorganisms containing them, and uses in the fermentive production of amino acids are also discussed. (Contains 64 citations fully indexed and including a title list.)

6E. Clinical Medicine

514,578
AD-A148 869/1/GAR PC **A02/MF A01**
School of Aerospace Medicine, Brooks AFB, TX.
Squamous Cell Carcinoma with Metastasis in a Rhesus Monkey (Macaca mulatta).
Final rept.,
G. B. Hubbard, D. H. Wood, and J. W. Fanton. Oct 83, 5p Rept no. USAFSAM-TR-83-268
Pub. in Laboratory Animal Science, v33 n5 p469-472 Oct 83.

No abstract available.

514,579
AD-A148 890/7/GAR PC **A03/MF A01**
Army Health Care Studies and Clinical Investigation Activity, Fort Sam Houston, TX.
Army Nurse Corps Personnel Management Practices (Executive Summary).
Final rept. Nov 81-Sep 84,
A. J. Frelin, T. R. Misener, and H. F. Mechanic. Sep 84, 32p Rept no. HCSCIA-83-005A

All Army Nurse Corps (ANC) officers were surveyed (91% responded) to provide insight into important attitudes, preferences, and responses to a wide range of personnel proposals, education, opportunities, and nursing assignments. Conclusions were: (1) Pay/Allowances/Benefits (a) not a primary issue in attrition except for 66Fs (do not have pay parity with civilians), (b) most support the issue of professional pay for some groups of nurses, and (c) much concern with perceived erosion as evidenced by pay caps, high unreimbursed expenses, and proposals to reduce existing benefits; (2) Present Duty (a) primary concern of all groups is short-fall of personnel available to carry out mission, (b) most ANCs like their jobs; (3) Assignments/Career Planning, ANCs do not believe they have adequate input into career planning/assignments; (4) Military Professional Issues (a) ANC is a professional Corps, proud of its place/responsibility to USA, (b) reluctant to give up recognition of excellence for promotion/selection for leadership positions; (5) Professional Issues (AMEDD Nursing) - ANCs perceive role of AMEDD nursing more professionally challenging than civilian sector, and (6) Attrition Propensity (a) not high in ANC, (b) most frequently cited reason for leaving is inability to combine career and family, (c) most frequently cited reason for staying is professional growth opportunities.

514,580
AD-A148 942/6/GAR PC **A02/MF A01**
Walter Reed Army Inst. of Research, Washington, DC.
Expression of Lipopolysaccharide 0 Antigen in Escherichia coli K-12 Hybrids Containing Plasmid and Chromosomal Genes from Shigella dysenteriae 1,
T. L. Hale, P. Guerry, R. C. Seid, C. Kapfer, and M. E. Wingfield. Nov 84, 8p
Pub. in Infection and Immunity, v46 n2 p470-475 Nov 84.

No abstract available.

514,581
AD-A148 970/7/GAR PC **A02/MF A01**
Walter Reed Army Inst. of Research, Washington, DC.
Monocional Antibodies to Serotype 2 and Serotype 15 Outer Membrane Proteins of Neisseria meningitidis and Their Use in Serotyping,
W. D. Zollinger, E. E. Moran, H. Connelly, R. E. Mandrell, and B. Brandt. Oct 84, 9p
Pub. in Infection and Immunity, v46 n1 p260-266 Oct 84.

No abstract available.

514,582
AD-A149 033/3/GAR PC **A11/MF A01**
Army Inst. of Surgical Research, Fort Sam Houston, TX.
Proceedings of the International Burn Research Conference Held at San Antonio, Texas on 19-21 January 1983.
21 Jan 83, 245p

Contents: Fluid Resuscitation, Wound Care, Pulmonary Effects Of Burn Injury, Infection and Sepsis, Skin Substitutes, Metabolic Effects Of Injury, and Nutritional Support Of Injured Man.

514,583
DE85000860/GAR PC **A02/MF A01**
Lawrence Livermore National Lab., CA.
Impact of Instrument Response Variations on Health Physics Measurements.
G. A. Armantrout. Oct 84, 6p UCRL-91682, CONF-841007-7
Contract W-7405-ENG-48
Nuclear science symposium, Orlando, FL, USA, 31 Oct 1984.
Portions are illegible in microfiche products.

Uncertainties in estimating the potential health impact of a given radiation exposure include instrument measurement error in determining exposure and difficulty in relating this exposure to an effective dose value. Instrument error can be due to design or manufacturing deficiencies, limitations of the sensing element used, and calibration and maintenance of the instrument. This paper evaluates the errors which can be introduced by design deficiencies and limitations of the sensing element for a wide variety of commonly used survey instruments. The results indicate little difference among sensing element choice for general survey work, with variations among specific instrument designs being the major factor. Ion chamber instruments tend to be the best for all around use, while scintillator-based units should not be used where accurate measurements are required. The need to properly calibrate and maintain an instrument appears to be the most important factor in instrument accuracy. 8 references, 6 tables. (ERA citation 10:003203)

514,584
HRP-0905965/0/GAR PC **A17/MF A01**
Western Consortium/Western Center for Health Planning, San Francisco, CA.
Guide to Health Planning Law: A Topical Digest of Health Planning and Certificate of Need Case Law,
J. B. Simpson, and T. Bogue. Sep 84, 383p
Contract PHS-HRSA-232-79-0037

The Guide to Health Planning Law is a specialized research tool for lawyers, health planners, and others who must work within the complex regulatory system created by the federal Health Planning Act and the various state Certificate-of-Need statutes. Although its subject-matter is judicial decisions, the authors intend that it be a useful reference tool for non-lawyers, and it has been prepared and organized with that end in mind. The Guide contains two major sections: an introductory text describing certificate of need and health planning law and a topical digest of certificate of need and health planning case law. The topical digest consists of a detailed table of contents in outline form listing the topics and issues which arise in health plan-

ning, followed by detailed annotations to the judicial opinions that have considered those topics and issues.

514,585
N85-13467/4/GAR PC**$7.00**
National Aeronautics and Space Administration, Washington, DC.
Aerospace Medicine and Biology, a Continuing Bibliography with Indexes.
Dec 84, 68p NAS 1.21:7011(265), NASA-SP-7011(265)

This bibliography lists 197 reports, articles and other documents introduced into the NASA scientific and technical information system in November 1984.

514,586
N85-13469/0/GAR PC **A04/MF A01**
George Washington Univ., Washington, DC.
Space Medicine Research Publications: 1983-1984. Final Report.
J. L. Solberg, and L. G. Pleasant. Dec 84, 71p NAS 1.26:3860, NASA-CR-3860
Contract NASW-3165

A list of publications supported by the Space Medicine Program, Office of Space Science and Applications is given. Included are publications entered into the Life Sciences Bibliographic Database by The George Washington University as of October 1, 1984.

514,587
PB84-922808/GAR PC**$8.00/MF A01**
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Postoperative Adjuvant Therapy of Breast Cancer. Oncology overview.
Dec 84, 64p NCI/ICRDB/OT-84/08

Oncology Overviews are a service of the International Cancer Research Data Bank (ICRDB) Program of the National Cancer Institute, intended to facilitate and promote the exchange of information between cancer scientists by keeping them aware of literature related to their research being published by other laboratories throughout the world. Each Oncology Overview represents a survey of the literature associated with a selected area of cancer research. It contains abstracts of articles which have been selected and organized by researchers associated with the field. Contents: Postoperative chemotherapy; Postoperative radiotherapy; Postoperative hormone therapy; Postoperative immunotherapy and chemoimmunotherapy; Postoperative multimodal therapy; Prognostic factors in postoperative adjuvant therapy.

514,588
PB85-139921/GAR PC **A02/MF A01**
National Center for Health Services Research, Rockville, MD.
Knowledge of Their Health Insurance Coverage by the Elderly,
G. L. Cafferata. c1984, 16p NCHSR-84/219
Pub. in Medical Care, v22 n9 p835-847 Sep 84.

Current legislative proposals to increase competition among private insurers assume that people are or can be well-informed about their insurance coverage. Evidence from the National Medical Care Expenditure Survey shows that among the population 65 years of age or older knowledge about health insurance coverage is substantial but generally lower than in the population younger than 65 years of age. Multivariate analysis is used to identify factors associated with high and low levels of knowledge. Although correct knowledge of coverage of particular services is highly associated with current experience of health problems, with use of these health services, and with the cost for private insurance, overall knowledge is lowest among some groups at high risk of serious illness, in particular, the old, nonwhites, and persons enrolled in Medicare but without Medicaid or private insurance supplements.

514,589
PB85-141729/GAR PC **A04/MF A01**
Columbia Univ., New York.
Planning Familial: Son Effet sur la Sante de la Femme et de l'Enfant (Family Planning: Its Effect on the Health of the Woman and Child),
D. Maine, and J. E. Revson. 1981, 61p AID-PN-AAL-775
Text in French. See also PB82-259573.

Despite recent progress in improving maternal and child health, 15 million children under age 5 die every year in developing countries. A million others are orphaned by the deaths of their mothers during pregnancy or childbirth. This report presents statistical data, supplemented by narrative text, demonstrating how family planning can help women avoid or reduce risks to their own and their children's health, e.g., risks caused by too frequent pregnancies or by pregnancy in women too young or too old. Charts are presented displaying data from several countries on a variety of factors pertinent to maternal and child health and on correlations among these factors. Included are data on, inter alia: birth spacing; average number of children; relationships between infant mortality and birth order, and between birth defects and age of mother; maternal mortality from induced abortion; women with three living children who wish to have no more children; percentages of women using no contraceptives, ineffective methods, and effective methods; percentages of women with and without knowledge of or access to contraceptives; and mortality resulting from various contraceptive methods.

514,590
PB85-142768/GAR PC **E03/MF E03**
Centre de Recherches du Service de Sante des Armees, Lyon (France). Div. de Microbiologie.
Etude des Hepatites Virales (Study of Viral Hepatitis).
Final rept.,
R. Deloince, and R. Fontanges. 10 Jan 83, 19p
Text in French. See also PB85-142776. Sponsored by Centre de Documentation de l'Armement, Paris (France). Direction des Recherches, Etudes et Techniques.

Viral hepatitis is still on the rampage among our troups and is responsible for long periods of absenteeism. Raising the sanitary level of the country leads to a delay in the emergence of a natural immunity against the hepatitis Type A agent. One must therefore be aware of the danger of an outbreak of epidemics within the adult population grouped in difficult life situations in the case of a conflict. After the success of gamma prophylaxis, whose use remains necessary, if limited, it would seem useful at the level of the Health Services of the Armed Forces to follow and participate in the work done concerning the hepatitis A virus, which work would produce in a few years the production of a vaccine.

514,591
PB85-144095 Not available NTIS
North Carolina Univ. at Chapel Hill. School of Medicine.
Frequency Dependence of Effective Nasal Resistance.
Journal article,
J. M. Fullton, N. D. Fischer, A. F. Drake, and P. A. Bromberg. c1984, 7p EPA/600/J-84/169
Grant EPA-R-805184
Pub. in Annals of Otology, Rhinology and Laryngology, v93 n2 p140-145 1984.

Forced random noise techniques were used to characterize the effective resistance of the nasal passages in normal subjects and subjects who were candidates for surgical correction of nasal obstruction. The slope of the effective resistance curve was characterized by the average resistances over 3 to 5 Hz and 13 to 15 Hz. Subjects with nasal obstruction had effective nasal resistance curves which were more frequency dependent than those of normal subjects ($p<0.05$). A mathematical model consisting of two series resistance-inertance elements in parallel was used to simulate the nasal passages. With this model the authors were able to generate effective resistance curves similar to those measured in both normal and obstructed subjects. The forced random noise technique may be a convenient, noninvasive technique for studying the fluid mechanical properties of airflow in the nasal passages and the effects of pharmacological and surgical interventions on nasal resistance.

514,592
PB85-144632/GAR PC **A04/MF A01**
Nutrition Inst., Cairo (Egypt).
Arab Republic of Egypt Nutrition Status Survey II, 1980.
1980, 58p AID-PN-AAM-207
Sponsored by Centers for Disease Control, Atlanta, GA.

After a 1978 nutrition survey conducted in six rural areas of Egypt showed only a low prevalence of acute undernutrition in preschool children, a follow-up survey was conducted in 1980 in two of the six areas. The results of the second survey, which unlike the first was conducted during a time of high seasonal diarrheal illness, are herein reported. Comparisons are made between the two surveys regarding: the prevalence and distribution of acute and chronic undernutrition among children with and without recent acute diarrheal disease; the prevalence and distribution of anemia and of clinical signs of micronutrient deficiencies; and duration and patterns of breastfeeding and weaning. The use of oral rehydration therapy is also examined.

514,593
PB85-145670/GAR PC **A08/MF A01**
Chicago Univ., IL. Community and Family Study Center.
Contraception: A Guide to Birth Planning Methods,
D. R. Barcelona, P. F. Bautista, and D. J. Bogue. c1981, 158p AID-PN-AAL-294
Grant AID/pha-C-1177

In both developing and developed countries, women's failure to use contraception is often due to lack of adequate information about the various methods, how to use them, and the likelihood of side effects. This manual provides, in simple detail and nontechnical language (with many illustrations), descriptions of major contraceptive methods, their advantages and disadvantages, reliability, correct use, possible side effects, and the means by which they may be obtained. The manual's first eight chapters each describe a method of contraception: the pill (including injectables); IUD's; condoms; diaphragms; spermicides; periodic abstinence; female sterilization; and male sterilization. The remaining two chapters discuss human sexuality and the physiology of reproduction.

514,594
PB85-145720/GAR PC **A03/MF A01**
Food and Drug Administration, Rockville, MD. Center for Devices and Radiological Health.
Recommendations for Quality Assurance Programs in Nuclear Medicine Facilities.
Radiation recommendations series,
P. Segal, and D. R. Hamilton. Oct 84, 28p HHS/PUB/FDA-85-8227, FDA/CDRH-85/14

The publication provides the elements that should be considered by nuclear medicine facilities to improve their existing programs or develop new quality assurance programs. The important administrative aspects of quality assurance programs are stressed. Each facility is encouraged to adopt those elements of the recommended program that are appropriate to its individual needs and resources.

514,595
PB85-146116/GAR PC **A14/MF A01**
Massachusetts Dept. of Public Welfare, Boston.
Case Management and Prepaid Capitation as a Cost-Effective and Improved Method of Delivery of Dental Services: Massachusetts Dental Project.
Final rept. Feb 80-Jan 84,
D. Medalia. Aug 84, 313p
Grant HCFA-11-97388-1

The Massachusetts Dental Project (MDP) was a 4-year research demonstration study funded by the Health Care Financing Administration's Office of Research and Demonstrations and by the Massachusetts Department of Public Welfare (MDPW). The goal of the study was to assess the capitated financing method of delivering dental services to AFDC recipients. Data collection on the dental needs and services provided to enrolled members was conducted from July 1981 through June 1983. MDPW contracted with ten dental practices to provide dental services to approximately 2,300 AFDC recipients who enrolled in the research study. Enrollees were offered three incentives to join MDP. Two control groups comprised of Medicaid families with children were selected for comparison with the MDP study group. MDP's capitation rate was based on a chair-hour formula and was $4.20 per enrollee per month. The major finding of the study is that capitation financing of dental care for AFDC recipients can potentially result in cost savings for Medicaid on both a short- and long-term basis.

514,596
PB85-146215/GAR PC **A11/MF A01**
Office of Technology Assessment, Washington, DC.

Medical Technology and Costs of the Medicare Program.
Jul 84, 231p OTA-H-227
See also PB85-145944. Library of Congress catalog card no. 84-601085.

This assessment explores the dual relationship between medical technology and the Medicare program: Medicare policies affect the adoption and use of medical technologies, and the patterns and levels of use of medical technologies significantly affect Medicare costs. It reviews specific Medicare policies--eligibility, benefits, payment, and beneficiary cost-sharing--that have had an influence on the adoption and use of medical technology. It also examines the contribution of medical technologies to increases in Medicare costs. The report identifies several possible changes in Medicare policies that could be used to influence medical technology adoption and use and to restrain Medicare program costs. These mechanisms fall into four general categories: Medicare's coverage policy for individual medical technologies; methods of Medicare payment to hospitals; methods of Medicare payment to physicians; incentives for the adoption and use of technology that do not directly involve, but may be related to, the Medicare payment mechanism (e.g., encouraging the development of alternative cost-effective health care delivery systems).

514,597

PB85-147494/GAR PC **A04**/MF **A01**
California Univ., San Francisco. School of Medicine.
Readjustment of Older Persons After Acute Hospitalization.
Final rept.,
J. C. Barbaccia, and E. R. Lurie. Aug 83, 54p NIMH-85-465
Grant PHS-MH-32731

Patient status, services prescribed and interpersonal resources of 170 patients 65 years of age and older who were discharged from three San Francisco hospitals were studied. The study related these issues to life satisfaction and found that linkage between acute medical care and other levels in the community is haphazard.

514,598

PB85-159341/GAR PC **A03**/MF **A01**
Veterans Administration Medical Center, Phoenix, AZ.
Post-Traumatic Stress Disorder with Special Attention to Vietnam Veterans: Selected Bibliography (16th Revision).
A. L. Arnold. 8 Nov 84, 45p

This is the sixteenth version and the bibliography now contains over six hundred citations. Most references cited in this bibliography are articles which have been published in scientific journals or as hard-cover monographs; a few are published personal accounts by veterans themselves. The bibliography includes citations based upon combat related psychiatric disorders dating back to World War I, but the references are predominantly related to the Vietnam War.

514,599

PB85-162139/GAR PC**$6.00**/MF **A01**
Centers for Disease Control, Atlanta, GA.
Reports on AIDS (Acquired Immunodeficiency Syndrome) Published in the Morbidity and Mortality Weekly Report, June 1981 through January 1985.
Mar 85, 100p

The publication includes all the articles related to AIDS that have appeared in the Morbidity and Mortality Weekly Report, published by the Centers for Disease Control (CDC). These articles, arranged in chronological order, track the reporting of information on AIDS from 1981, when CDC first published information on Kaposi's sarcoma and Pneumocystis carinii pneumonia occurring in young homosexual men. In 1981, CDC formed a task force to establish risk factors, carry out laboratory studies, and disseminate timely information on the disease now known as the acquired immunodeficiency syndrome (AIDS).

514,600

PB85-855369/GAR PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Genetic Engineering: Monoclonal Antibodies. 1980-February 1985 (Citations from the U. S. Patent Data Base).
Rept. for 1980-Feb 85.
Feb 85, 47p

This bibliography contains citations of selected patents concerning methods of production, and the utilization of monoclonal antibodies. These antibodies are characterized by the quality of selective reactivity to particular antigenic determinants. Applications include use in immunometric assays, interferon purification, vaccine screening, and therapeutic treatment of disease by immunosuppression. Methods to increase production of particular antigen-reactant antibodies, and methods of producing a recombinant monoclonal antibody with duplicity of reactivity are also included. (Contains 50 citations fully indexed and including a title list.)

6F. Environmental Biology

514,601

DE85000160/GAR PC **A08**/MF **A01**
Oak Ridge National Lab., TN.
Health and Environmental Effects Document on Direct Coal Liquefaction, 1983.
C. S. Dudney, E. D. Copenhaver, and P. J. Walsh.
Oct 84, 163p ORNL/TM-9287
Contract AC05-84OR21400
Portions are illegible in microfiche products. Original copy available until stock is exhausted.

A systematic analysis of data pertinent to an installed 1-quad direct coal liquefaction industry is presented. The document identifies major health and environmental effects of the industry, principal sources of uncertainty in the assessment of major effects, and research needed to reduce uncertainty. In addtion, impacts not yet analyzed has been identified along with an indication of which impacts should be addressed. 105 references, 6 figures, 34 tables. (ERA citation 10:001801)

514,602

PATENT-4 484 539 Not available NTIS
Department of Agriculture, Washington, DC.
Oviposition Stimulant for Trichogramma Spp.
Patent,
W. C. Nettles, R. K. Morrison, Z. N. Xie, D. Ball, and C. A. Shenkir. Filed 15 Sep 83, patented 27 Nov 84, 4p PB85-141786, PAT-APPL-6-532 431
Supersedes PB84-120229.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $1.00.

A unique and valuable process for stimulating oviposition in insects is disclosed. Artificial wax eggs containing a salt solution with one or more ions selected from the group consisting of K(+), Mg(2+), Cl(-), and SO4(2-) are fabricated. The concentration of the salt solution is critically designed to be sufficient to stimulate the insects. The insects are brought into contact with the artificial eggs for sufficient time and at sufficient temperature to allow the insects to oviposit their eggs into the salt solution as a result of the stimulus of the solution.

514,603

PB85-855237/GAR PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Water Pollution: Uptake of Heavy Metals by Shellfish and Marine Plants. 1974-February 1985 (Citations from Oceanic Abstracts).
Rept. for 1974-Feb 85.
Feb 85, 191p
Supersedes PB84-854306. Prepared in cooperation with Cambridge Scientific Abstracts, Washington, DC.

This bibliography contains citations concerning heavy metal contamination of shellfish and marine plants. Toxicity levels and the long term effects on the ecology of the marine environment are discussed. The growth rate of marine life as a function of metal concentration and the long term effects on the food chain are also considered. (This updated bibliography contains 256 citations, 12 of which are new entries to the previous edition.)

6H. Food

514,604

AD-A148 850/1/GAR PC **A03**/MF **A01**
Army Natick Research and Development Center, MA.
Cold Weather 83 Evaluation of the Mobile Food Service Unit and Tray Packs.
Final rept.,
H. J. Kirejczyk. Aug 84, 39p Rept no. NATICK/TR-85/009

This report details the field evaluation of the Mobile Food Service Unit and T Rations, two key elements of the proposed new USMC field feeding system for the 1990's, during the NATO exercise Cold Weather-83. Major conclusions drawn from this evaluation include: the Mobile Food Service Unit (MFSU) is a highly effective, labor efficient concept for extreme cold weather environments; proposed new system staffing levels which provide an overall 66% reduction in manpower requirements are adequate; and hot T Ration meals, to include regular and single hot-item meals (large portion of casserole or stew-type item) are highly acceptable in cold environments.

514,605

AD-A148 937/6/GAR PC **A03**/MF **A01**
Army War Coll., Carlisle Barracks, PA.
Look at Meat and Poultry Production in the Soviet Union.
Study project,
R. A. Thompson. 29 May 84, 38p

The Food Program announced by the Communist Party Central Committee in May 1982 is a major effort to increase per capita consumption of quality food, especially the supply of meat and poultry products. The United States currently supplies about one-third of Soviet grain imports and there is good potential for this share to increase further, if the US can regain credibility as a reliable grain supplier. A convincing argument can be made that distinct political advantage accrues to that country which has abundant agricultural commodities and through long-term trade relationships elicits from the other a degree of dependence for their food imports. The vagaries imposed on the Soviet agricultural sector by weather, centralized management, farmworker productivity, and ruble constraints probably means that the USSR will be a major importer of agricultural commodities for the foreseeable future. The planned per capita consumption of meat and poultry by 1990 will still fall 18 pounds short of Soviet nutritional norms and will be about 66 pounds short of current annual US consumption. In a country where military priorities have been allowed to dominate domestic policies to the point where canning of food is limited by the shortage of steel to make cans, there will certainly be much study in the Kremlin over guns-or-butter issues in the years ahead.

514,606

AD-A148 953/3/GAR PC **A06**/MF **A01**
Army Natick Research and Development Center, MA.
Field Feeding System to Support USMC Forces in the 1990s.
Final rept.,
H. J. Kirejczyk. Jul 84, 103p Rept no. NATICK/TR-85/011

The proposed new field system provides the responsiveness, mobility, and flexibility required to support the USM's combat role of the 1990s and to ensure combat troops receive frequent, high quality, highly acceptable hot meals. Major components of the system include Mobile Food Service Units, Modular Field Kitchens, and the T Ration. The T Ration incorporates Tray Packs, (precooked heat-and-serve food items for the entree, starch vegetable, and dessert meal components) as well as bread products, condiments, and beverages. In addition, the new system offers a 9% reduction in total cost, 66% reduction in personnel requirements, a 73% reduction in water requirements, and a 94% reduction in fuel requirements.

514,607

PB85-141653/GAR PC **A02**/MF **A01**
RAND Corp., Santa Monica, CA.

Improving Infant Nutrition, Health and Survival: Policy and Program Implications from the Malaysian Family Life Survey.
W. P. Butz, J. P. Habicht, and J. DaVanzo. Jun 81, 24p R-2924-AID, ISBN-0-8330-0428-X, AID-PN-AAL-977
Contract AID/otr-G-1822

Infants' nutrition, health, and survival are matters of great concern in developing countries. This report presents the principal program and policy implications from a survey and research project that has investigated these phenomena in Peninsular Malaysia. We begin by describing the Malaysian setting, particularly post-World War II trends in infant mortality and breastfeeding. These are the two policy targets of central interest. We then describe the data analyzed in this research and briefly indicate their quality. With this background, we proceed to the central topic: our research findings that are relevant for public programs in the areas of health, nutrition, family planning, water and sanitation, as well as several findings with implications for overall socioeconomic policy. The report ends by emphasizing the most important implications for future research and for current program and policy initiatives.

514,608
PB85-144582/GAR PC **A06**/MF **A01**
Checchi and Co., Washington, DC.
Mauritania: Rural Assessment and Manpower Surveys. The Food and Nutritional Situation in Mauritania.
1981, 108p AID-PN-AAM-229
Contract AID/afr-C-1489
Sponsored by Louis (Berger) International, Inc., East Orange, NJ., and Action Programs International, Santa Monica, CA.

The rudimentary information available on Mauritania's food and nutrition situation is analyzed in this two-part report. In Part I, the geographical and demographic features of the country's main ecological zones are briefly noted, past nutritional studies reviewed, and data on the regional and per capita availability of cereals (millet/sorghum, rice) presented. Mauritanians' cereal-based dietary habits are outlined and the effect of income on the urban diet analyzed. Various in-country nutrition programs are described. Part II presents results of a 1980 food consumption survey conducted under the RAMS (Rural Assessment and Manpower Surveys) Project. The survey showed that caloric intake - which depends excessively on imports - is sufficient in only 55-60% of households and is especially deficient among the urban poor, e.g., in Akjoujt and among young children in Nouakchott's fifth arrondissement, as well as among nomads in the second, third, and fourth regions.

514,609
PB85-145696/GAR PC **A06**/MF **A01**
Michigan State Univ., East Lansing. Dept. of Agricultural Economics.
Socio-Economic Determinants of Food Consumption and Production in Rural Sierra Leone: Application of an Agricultural Household Model with Several Commodities.
International development paper no. 5,
J. Strauss. c1983, 102p AID-PN-AAM-031
Contract AID/DSAN-C-0008
Prepared in cooperation with Virginia Univ., Charlottesville.

To provide needed information on the effect of developing country policies on household food consumption and nutrition, this paper reports the consumption response of five food items, nonfoods, and labor supply to prices, full income, and some demographic variables in Sierra Leone under both fixed and variable prices. A model of a rural household-firm (which produces the food it consumes) is specified and estimated, using data from a survey of a cross-section of rural households.

514,610
PB85-152767/GAR MF **E10**
Food and Drug Administration, Washington, DC. Center for Food Safety and Applied Nutrition.
FDA (Food and Drug Administration) Retail Food Protection Program Information Manual.
Dec 84, 1395p FDA/CFSAN-85/17
Microfiche copies only.

The manual provides a system for the consolidated issuance of all material related to food service, food vending, and food stores which had previously been issued as coded memoranda, identical memoranda, manuals, standards, pamphlets, listings, booklets, and bulletins. The Retail Food Protection Program Information Manual is a cooperative Federal-state program concerned with the safety of food at the retail level. The FDA asists and supports more than 3,500 state and local regulatory agencies whose primary responsibility is the monitoring of retail food operations, by coordinating development of uniform standards, providing technical assistance and interpretation, acting as a focal point for information exchange, providing information, developing training aids, providing training and upon request, evaluating state programs. The Contents include Codes and Adoptions; Information Exchange and Training; Inspection; Investigation; Evaluation; Facility Planning, Plan Review, and Equipment Standards; and National Industry Profiles.

514,611
PB85-854909/GAR PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Nisin in Foods. 1972-February 1985 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for 1972-Feb 85.
Feb 85, 86p
Supersedes PB83-869396. Prepared in cooperation with International Food Information Service, Frankfurt am Main(Germany, F.R.).

This bibliography contains citations concerning nisin, an antimicrobial preservative widely used outside the United States. Citations concerning nisin as a preservative or stabilizer in food, wine, and dairy products, and a degassing agent in processed cheeses are presented. The applications of nisin in preventing germination of heat-resistant spores in low-acid products and aciduric organisms in acid-pack canning are discussed. Measurement methods for the determination of nisin content are also included. (This updated bibliography contains 118 citations, 11 of which are new entries to the previous edition.)

514,612
PB85-855088/GAR PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Food Packaging and Storage. June 1977-February 1985 (Citations from the NTIS Data Base).
Rept. for Jun 77-Feb 85.
Feb 85, 164p
Supersedes PB83-804740.

This bibliography contains citations concerning the packaging and processing of foods for storage. Topics include the biochemical aspects of plastic, paper, and paperboard packaging materials. Irradiation research on different foods to extend their shelf life are discussed, as well as the processing and storage problems of a variety of seafoods. (This updated bibliography contains 185 citations, 33 of which are new entries to the previous edition.)

514,613
PB85-855278/GAR PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Vegetable Oils. June 1983-February 1985 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for Jun 83-Feb 85.
Feb 85, 148p
Supersedes PB84-860279. Prepared in cooperation with International Food Information Service, Frankfurt am Main(Germany, F.R.).

This bibliography contains citations concerning the preparation and use of vegetable oils. Production methods, chemical compositions, refining, hydrogenation, oxidation stability, and properties of heated oils are discussed. Marketing methods for vegetable oils are also considered. (This updated bibliography contains 212 citations, 115 of which are new entries to the previous edition.)

6J. Industrial (Occupational) Medicine

514,614
DE84016028/GAR PC **A13**/MF **A01**
National Bureau of Standards, Washington, DC.
Tripartite Conferences on Radiation Protection: Canada, United Kingdom, United States (1949-1953).
L. S. Taylor. Aug 84, 280p NVO-271
Contract AP08-83NV10305

As a result of largely informal contacts between scientists from the United States, Canada, and United Kingdom, it became evident to their governments that, to insure compatible protection practices, closer technical cooperation must be established. This led to a two-day conference between representatives of the three governments at Chalk River, Ontario in September 1949; it was the first of what became known as the Tripartite Conferences. The initial talks led quickly to agreement on the new NCRP proposals for a basic permissible dose for the exposure of workers to external sources of radiation. A second meeting in Harwell, England, during the summer of 1950 reached tentative agreement on the outstanding problems. The third and last Tripartite Conference took place at Harriman, New York, in early spring 1953. This meeting produced the final recommendations, insofar as they involved agreements between the three countries, for new protection standards. Questions regarding the proceedings of the conferences and interpretations of their findings have arisen over the succeeding years; even as recently as 1983. Continued interest and consequent inquiries emphasized the desirability of providing more permanent documentation of those very important conferences. This author, a member of the United States delegation to all three conferences, came into possession of most of the working papers and final reports, hence he has felt the obligation to assemble this material for both technical and historical reference. This report compromises mainly of a brief discussion of the conferences themselves, with some background information leading up to their organization. (ERA citation 10:003872)

514,615
DE85000838/GAR PC **A02**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Krypton-85 Health Risk Assessment for a Nuclear Fuel Reprocessing Plant.
P. J. Mellinger, J. E. Tanner, L. W. Brackenbush, and E. S. Gilbert. Aug 84, 16p PNL-SA-12187, CONF-840806-13
Contract AC06-76RL01830
18. DOE nuclear airborne waste management and air cleaning conference, Baltimore, MD, USA, 13 Aug 1984.
Portions are illegible in microfiche products.

A health risk assessment was conducted to investigate the impact of implementing regulations from the Environmental Protection Agency's Final Environmental Statement - 40 CFR 190 - Environmental Protection Requirements for Normal Operation of Activities in the Uranium Fuel Cycle. Potential risks involved in the routine release of sup 85 Kr from nuclear fuel reprocessing operations to the environment were compared to those resulting from the capture and storage of sup 85 Kr. The average occupationally exposed worker was estimated to receive about 400 to 600 mrem/y from sup 85 Kr recovery and immobilization activities. This dose is a factor of 20,000 to 30,000 higher than the estimated dose to the maximum offsite individual (0.02 mrem/y), and a factor of 130,000 to 200,000 higher than the dose received by the average member of the 50-mile population (0.003 mrem/y) from routine release of all sup 85 Kr. Given the uncertainties in the models used to generate lifetime risk numbers (0.02-0.027 radiation induced fatal cancers expected in the occupational workforce and 0.017 fatal cancers in the general population), the differences in total risks cannot be considered meaningful. There is certainly no reason to conclude that risks from sup 85 Kr routinely released to the environment are greater than those that would result from recovery, immobilization and storage of the noble gas. 22 references, 1 figure, 3 tables. (ERA citation 10:002011)

514,616
HRP-0906070/8/GAR PC **A08**/MF **A01**
Arizona Center for Occupational Safety and Health, Tucson.

Primer of Occupational and Environmental Medicine: A Manual for Family Physicians and Other Primary Care Physicians,
J. C. Hake, K. M. Rest, and D. A. Cordes. 7 Sep 84, 170p
Contract PHS-HRA-232-81-0047

The prevention of occupational illness and injury is a team effort involving workers, employers, physicians, engineers, industrial hygienists, and others. Physicians have a special tool available to them to help them contribute to this effort - the occupational and environmental history. It is the key to unlocking the often confusing relationship between work and health. Use of the occupational and environmental history helps physicians keep their patients well; it also helps them determine if the job is a contributing factor to their patients' health problems.

514,617
HRP-0906074/0/GAR PC **A03**/MF **A01**
Arizona Center for Occupational Safety and Health, Tucson.
Asbestos: Expedience, Exposure, and Human Experience,
M. R. Gray, and S. Shapiro. 1984, 42p
Contract PHS-HRA-232-81-0047

Asbestos is a remarkably ubiquitous material. It is used in many different industries, as well as in building construction, brake linings, and tires. A recent statement from the Department of Health, Education and Welfare (HEW) indicates that between eight and eleven million workers have been exposed to asbestos since World War II; of these and others, as many as 5.6 million people may die of cancer or other asbestos-related diseases. Between 1967 and 1976 in a study of deaths due to cancer among asbestos insulation workers in New York and New Jersey there were three times that expected for a comparable unexposed population (123). Eight to nine percent of these deaths were due to otherwise rare mesotheliomas. The prevalence of asbestos-related disease among exposed workers and members of the community can only be grossly estimated because exposure is common, widespread, and often not visible, as in uncontrollable environments such as the home. The many years between exposure to asbestos and the onset of disease further obscure the identification of asbestos as the etiologic agent. Because of the pervasive nature of this problem and the high mortality rates associated with asbestos exposure, it is urgent that the primary care physician, be able to recognize the various sources of exposure, appropriately screen patients to identify presence of asbestos-related diseases, and institute effective preventive as well as therapeutic management, or make appropriate referrals for specialized care.

514,618
HRP-0906079/9/GAR PC **A03**/MF **A01**
Arizona Univ. Health Sciences Center, Tucson.
Hazards to Women in the Workplace,
B. Warren. Dec 82, 50p
Contract PHS-HRA-232-78-0191

The issues involved in the hazards confronting women at work requires a review of historical factors and of changes in the roles of women in society. The many facets which are discussed in the report are considered as contributing hazards to women at work. These hazards include physical exposures to toxic substances, emotional and physical stress, threats to fertility and healthy reproduction, discrimination, and lack of adequate social support.

514,619
HRP-0906093/0/GAR PC **A03**/MF **A01**
Arizona Center for Occupational Safety and Health, Tucson.
Physician Evaluation of Impairment/Disability.
Project module,
J. L. Rea, W. V. Edwards, and D. H. Cordes. Dec 83, 49p
Contract PHS-HRA-232-81-0047

This module is about the family practitioner's role in assessing disability in individual patients. It will describe various methods of disability evaluation and will include case studies and discussion questions. The module will deal specifically with workers' compensation and social security disability, and specifically will not address more specialized aid programs such as those of federal employees or the U.S. military. Lastly, the module will underscore the importance of the family practitioner in this process by virtue of his/her forefront position and capacity as medical expert, referral source, and possible patient advocate.

514,620
PB85-147452/GAR PC **A02**/MF **A01**
Michigan Univ., Ann Arbor. Inst. for Social Research.
Social Roles and the Health of American Women.
Final rept.,
E. Douvan. May 83, 14p NIMH-85-464
Grant PHS-MH-33914

Conflicting claims about the health implications of women's work and family roles were evaluated. The nature and extent of health differences and the relationship between health status and risk factors were examined in 412 female respondents who completed a retrospective panel and 346 the prospective panel.

514,621
PB85-855302/GAR PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Coal Tar Hazards. 1976-February 1985 (Citations from the Energy Data Base).
Rept. for 1976-Feb 85.
Feb 85, 156p
Supersedes PB84-860543. Prepared in cooperation with Department of Energy, Washington, DC.

This bibliography contains citations concerning occupational and environmental hazards of coal tar. Topics include effluent treatment, emission control techniques, and occupational safety in the coking and coal mining industry. Health hazard evaluations, environmental surveys, technological assessments of industrial processes, and respiratory protection facilities are included. Carcinogenic hazards of coal dust are also discussed. (This updated bibliography contains 159 citations, 28 of which are new entries to the previous edition.)

6K. Life Support

514,622
N85-13471/6/GAR PC **A07**/MF **A01**
Foersvarets Forskningsanstalt, Stockholm (Sweden).
Experiments with Hydrox at 1.3 Mpa (13 ATM).
H. Oernhagen. Jun 84, 131p FOA-C-58014-H1
In Swedish; English Summary.

During a heliox saturation to 1.3 MPa, 3 divers were exposed on mask to hydrox (98% hydrogen, 2% oxygen) for periods up to 60 min. Depth narcosis, pulmonary mechanics, physical working capacities, isobaric gas supersaturation, and blood chemistry were studied. Results produce no evidence that hydrogen has a harmful influence. Compared with helium, respiration performances are better with hydrogen because of its low density. Hydrogen has an obvious narcotics effect and cannot be used undiluted at depths below 200 m.

6L. Medical and Hospital Equipment

514,623
PB85-135572/GAR PC **E04**/MF **E04**
Department of Health and Social Security, London (England).
Health Equipment Information Number 129, October 1984 (Evaluation Issue).
c1984, 37p
See also PB84-135656 and PB85-135614.

Contents: The evaluation program; Evaluation of defibrillators; Standards; Acknowledgements; Notes on hospital trials; Overall comparison; Evaluation summaries; Table of main characteristics; Results table; Description, technical and user assessments and manufacturers' comments; Service information; Supplier information; Defibrillator update information.

514,624
PB85-135580/GAR PC **E04**/MF **E04**
Department of Health and Social Security, London (England).
Health Equipment Information Number 125, September 1984 (Evaluation Issue).
c1984, 52p
See also PB85-135598, and PB84-142942.

This is the fourth report on the evaluation of infusion control instruments. The first three reports were each devoted to groups of instruments of broadly similar type. In this report, the authors review a mixed batch of syringe pumps, volumetric pumps and a controller.

514,625
PB85-135598/GAR PC **E04**/MF **E04**
Department of Health and Social Security, London (England).
Health Equipment Information Number 126, October 1984.
c1984, 27p
See also PB85-135606.

Partial Contents: The economics of the UK medical equipment market; Electromedical equipment evaluations at Royal Hallamshire Hospital, Sheffield; User assessment of IGE 'Star' nuclear medicine computer system; Pump priming of medical equipment; Xeroradiography of the head and neck; Wheelchairs for hospital use; Equipment for the disabled; Digital fluorography--guidance notes on technical specifications; and Comparative evaluation of medical argon ion laser systems.

514,626
PB85-135606/GAR PC **E04**/MF **E04**
Department of Health and Social Security, London (England).
Health Equipment Information Number 127, October 1984 (Evaluation Issue).
c1984, 38p
See also PB85-135614.

Contents: The evaluation program; Evaluation of ecg recorders; Special note for general practitioners; Standards; Overall comparison; Evaluation summaries; Table of main characteristics; Results table; Description, technical and user assessments and manufacturer's comments--(Cardiostat 703FI, Cambridge CM3000, Multiscriptor EK43, Saitron 103A); Service information; Supplier information.

514,627
PB85-135614/GAR PC **E04**/MF **E04**
Department of Health and Social Security, London (England).
Health Equipment Information Number 128, October 1984 (Evaluation Issue).
c1984, 37p
See also PB85-135572.

Contents: The evaluation program; Ultrasonic nebulisers; Overall comparison; Evaluation summaries; Main characteristics; DeVilbiss 35B; DeVilbiss 65; Intersurgical variosonic; Medap monsun; Mistogen EN145 (E); How ultrasonic nebulisers work; Standards used for testing humidifiers; Suppliers' addresses.

514,628
PB85-145928/GAR PC **A05**/MF **A01**
Office of Technology Assessment, Washington, DC.
Intensive Care Units (ICU's): Clinical Outcomes, Costs, and Decisionmaking.
Health technology case study,
R. A. Berenson. Nov 84, 99p OTA-HCS-28
See also PB85-146215. Library of Congress catalog card no. 84-601138.

This case study was prepared as part of the OTA project on Medical Technology and Costs of the Medicare Program. It provides an overview of the development of intensive care units (ICU) and their rapid diffusion into medical practice. It presents information on their utilization costs and reimbursement. It also describes various measures of outcomes of intensive care and reviews the outcome literature. Finally, the intricacies of decisionmaking in the ICU are discussed, and policy implications are presented.

514,629
PB85-145936/GAR PC **A03**/MF **A01**
Office of Technology Assessment, Washington, DC.

Boston Elbow.
Health technology case study,
S. J. Tanenbaum. Nov 84, 47p OTA-HCS-29
See also PB85-146215. Library of Congress catalog card no. 84-601139. Prepared in cooperation with Brandeis Univ., Waltham, MA.

The Boston Elbow is an artificial arm, battery-powered and myoelectrically controlled--i.e., controlled by signals from an amputee's stump muscles. It reproduces one active movement of the human arm, elbow flexion and extension. The Boston Elbow is technologically distinctive, but it is only one way to compensate for the loss of an arm. Nonprosthetic measures as well as competing prostheses are available to most amputees. The amputee-citizen is unlikely to be provided with a Boston Elbow, but Federal policies do create relevant research by the National Institute of Handicapped Research, regulation by the Food and Drug Administration, and legislated restatements of disability issues, such as the Rehabilitation Act of 1973. The Boston Elbow fares differently in different programs, and although this can be difficult for the amputee, it is the result of explicit mandates, institutional histories, and ongoing allocation of public resources.

514,630
PB85-145944/GAR PC **A04/MF A01**
Office of Technology Assessment, Washington, DC.
Market for Wheelchairs: Innovations and Federal Policy.
Health technology case study,
D. S. Shepard, and S. L. Karon. Nov 84, 70p OTA-HCS-30
See also PB85-146215. Library of Congress catalog card no. 84-601140. Prepared in cooperation with Harvard School of Public Health, Boston, MA. and Veterans Administration Medical Center, West Roxbury, MA.

This case study focuses on how Federal policies affect innovations in wheelchair characteristics. The study examines the wheelchair market and notes that one American in 200 is a wheelchair user. In 1982, an estimated 338,000 wheelchairs of all types were sold in the United States, for total retail sales of $126 million. The study also presents two examples of innovations in wheelchair design, the Power Rolls(c)IV, and a curb-climbing wheelchair available in parts of Europe, but not the United States.

514,631
PB85-855245/GAR PC **N01/MF N01**
National Technical Information Service, Springfield, VA.
Blood Flow Measurement. 1970-February 1985 (Citations from the U. S. Patent Data Base).
Rept. for 1970-Feb 85.
Feb 85, 117p

This bibliography contains citations of selected patents concerning methods and apparatus used to measure velocity and volume of blood flow within the cardiovascular system. Invasive and noninvasive techniques and devices are discussed, including ultrasonic and laser doppler velocimeters, and electromagnetic blood flow meters. Specific medical applications of such patents are presented, including ocular diagnosis, cardiac output measurement, and cerebral blood flow detection. (Contains 155 citations fully indexed and including a title list.)

6M. Microbiology:

514,632
AD-A148 875/8/GAR PC **A02/MF A01**
Ohio State Univ., Columbus. Dept. of Microbiology.
Mistranslation of the mRNA Encoding Bacteriophage T7 0.3 Protein,
J. B. Rice, R. T. Libby, and J. N. Reeve. 25 May 84, 7p AFOSR-TR-84-1120
Grant AFOSR-81-0087
Pub. in Jnl. of Biological Chemistry, v259 n10 p6505-6510, 25 May 84.

No abstract available.

514,633
AD-A148 935/0/GAR PC **A02/MF A01**
Army Medical Research Inst. of Infectious Diseases, Fort Detrick, MD.
Demonstration of a Capsule Plasmid in Bacillus anthracis,
B. D. Green, L. Battisti, C. B. Thorne, and B. E. Ivins. 16 Nov 84, 24p

Virulent and certain avirulent strains of Bacillus anthracis harbor a plasmid, designated pX02, which is involved in the synthesis of capsules. Two classes of rough noncapsulated (Cap-) variants were isolated from the capsule-producing (Cap+) Pasteur vaccine strain 6602: those which were cured of pX02 and those which still carried it. Reversion to Cap+ was demonstrable only in rough variants which had pX02. By means of a mating system in which plasmid transfer is mediated by a Bacillus thuringinensis fertility plasmid, pX012, pX02 was transferred from B. anthracis to Bacillus cereus. B. cereus transcipients which acquired pX02 produced capsules under the same conditions required for capsule synthesis by b. anthracis.

514,634
AD-A148 938/4/GAR PC **A02/MF A01**
Army Medical Research Inst. of Infectious Diseases, Fort Detrick, MD.
Crystallization of the Protective Antigen Protein of Bacillus anthracis,
V. S. Allured, L. M. Case, S. H. Leppla, and D. B. McKay. 2 Oct 84, 10p

The protective antigen protein, one of the three separate proteins constituting the exotoxin system of Bacillus anthracis, has been crystallized in a form suitable for high resolution structural studies. The crystal form which is most amenable to x-ray analysis is orthorhombic, space group P2,12121, a = 101.1 A, b = 95.4 A, c = 87.3 A, with one protective antigen monomer per asymmetric unit. (Author)

514,635
AD-A149 058/0/GAR PC **A02/MF A01**
Pennsylvania Univ., Philadelphia.
Mechanisms of Bunyavirus Virulence: A Genetic Approach.
Annual rept. 1 Oct 81-30 Nov 82,
N. Nathanson. 1 Feb 82, 18p
Contract DAMD17-82-C-2004

Contents: (1) Hybridomas against LaCrosse and Tahyna virus and (2) Virulence of LaCrosse and Tahyna isolates.

514,636
PB85-144160/GAR PC **A02/MF A01**
Environmental Protection Agency, Cincinnati, OH. Water Engineering Research Lab.
'Klebsiella' Occurrence, Significance and Detection in Water Systems: A Progress Report,
E. E. Geldreich, and E. W. Rice. Jan 85, 23p EPA/600/D-84/297

Frequent occurrence of Klebsiella in coliform colonization problems found in water supply distribution has prompted the development of a new medium (m-Kleb agar) for specific detection. The medium has excellent differential characteristics, and an average 94% Klebsiella recovery rate when used in the membrane filter procedure. This media may also be used as a streak plate to verify Klebsiella occurrence in the MF verification procedure or as a supplementary test in the multiple tube confirmation process. A proposed action plan with two levels of response to coliform occurrences in public water supplies is discussed.

6O. Pharmacology

514,637
AD-A148 857/6/GAR PC **A03/MF A01**
Hadassah Medical School, Jerusalem (Israel).
Mode of Action of Polyamine Analogues on the Growth and Biochemistry of Leishmanial Cells.
Rept. no. 1 (Final), 1 Apr 80-31 Mar 81,
U. Bachrach, and C. L. Greenblatt. 1 Apr 81, 38p
Rept no. 1
Grant DAMD17-80-G-9469

In the present study we confirmed the occurrence of polyamines in leishmanial promastigotes and showed that their synthesis is catalyzed by ornithine decarboxylase. The activity of this enzyme fluctuates during the growth cycle of leishmanial promastigotes and amastigotes. Dramatic changes in cellular polyamine levels and in the activity of ornithine decarboxylase were observed in macrophages infected with leishmanial amastigotes. It was shown that sinefungin, an ornithine-nucleoside, possesses potent antileishmanial activity and inhibits the growth of both leishmanial promastigotes and amastigotes. New aminoalkyl-anthraquinone derivatives have been synthesized; some of these exhibit potent antileishmanial activity. Compound WR-6026 was tested for its antileishmanial activity.

514,638
AD-A148 919/4/GAR PC **A10/MF A01**
Bio-Med, Inc., College Park, MD.
Army Drug Development Program. Phase I. Clinical Testing.
Annual rept. Feb 80-Jan 81,
J. A. Johnson. Feb 81, 214p
Contract DAMD17-75-C-5036

Studies of WR 180,409 H3PO4, a Pyridinemethanol with all subjects developed mild gastrointestinal symptoms after receiving 750 mg of the drug orally. WR 171,669, a phenanthrene methanol with demonstrated activity against chloroquine resistant P. Falciparum malaria, was studied in a single dose, double-blind, rising dose schedule in 28 subjects. In a study of the pharmacokinetics of WR 229, 870 (Sodium Stibogluconate Injection, BP) a single intravenous dose of 600 mg of Pentostam was given to eight subjects. No acute intolerance developed. In previous studies of WR 194,965 H3PO4 (an antimalarial of the Mannich base class), the top tolerated single dose in man was found to be less than the dose that cured 100% of Aotus monkeys infected with falciparum malaria.

514,639
AD-A148 928/5/GAR PC **A02/MF A01**
Kansas Univ. Medical Center, Kansas City. Dept. of Medicine.
Blood Substitutes: Effects on Drug Pharmacokinetics.
Annual rept. no. 1, 15 Sep 81-14 Sep 82,
G. R. Hodges. Sep 82, 21p
Contract DAMD17-81-C-1183

The effect of exchange transfusion with Fluosol DA 20% (FDA) or stroma-free hemoglobin (SFH) on the pharmacokinetics of penicillin and diazepam and on the effectiveness of penicillin therapy of pneumococcal infection in rats was determined. FDA prolongs the half-life of penicillin and does not alter the pharmacokinetics of diazepam. SFH increases the volume of distribution of both penicillin and diazepam and increases the half-life of diazepam. Penicillin only suppresses pneumococcal infection in FDA transfused rats but cures pneumococcal infection in SFH transfused rats.

514,640
AD-A148 973/1/GAR PC **A03/MF A01**
Istituto di Ricerche Farmacologiche Mario Negri, Milan (Italy).
Anticholinesterase Effects on Number and Function of Brain Muscarinic Receptors and Central Cholinergic Activity: Drug Intervention.
Final scientific rept. 1 Aug 82-31 Jul 84,
H. Ladinsky. 31 Oct 84, 47p AFOSR-TR-84-1122
Grant AFOSR-82-0306

Of pertinence to this study on possible feedback mechanisms that the anticholinesterase DDVP may activate as an acute adaptive response to its toxic actions, is our ongoing work on elucidating the feedback loops in the striatum and hippocampus which regulate cholinergic activity. Understanding of feedback loops further would indicate other means of mitigating toxicity, perhaps by potentiating mechanisms that reduce acetylcholine release. Tests are being made on new-type inhibitors of choline acetyltransferase, the enzyme responsible for the synthesis of acetylcholine as a means of protecting against anticholinesterase poisoning. The effects are being studied of cholinergic muscarinic receptor agonists and antagonists specific for type I (M1) or type II (M2) muscarinic receptors, on brain regional acetylcholine and choline contents and acetylcholine turnover rate. Preliminary results from the study show that only the M2 type drugs affect acetylcholine content. Specific M2 type antagonists are not presently available but theoretically they would be the drugs of choice as antidote for anticholinesterase poisoning. The powerful muscarinic antagonist, atropine sulfate, blocks both M1 and M2 type receptors.

514,641
AD-A149 031/7/GAR PC A02/MF A01
Yale Univ., New Haven, CT. School of Medicine.
Use of ATP-MgCl2 in the Treatment of Injury and Shock.
Annual rept. 1 Dec 79-31 Jul 81,
A. E. Baue, and I. H. Chaudry. 1 Aug 81, 15p
Contract DAMD17-76-C-6026

Studies on the hemodynamic (dose-response) effect of adenosine triphosphate-magnesium chloride infusion are summarized.

514,642
N85-13468/2/GAR PC A02/MF A01
Maryland Univ., College Park.
Modulation of the Cytosolic Androgen Receptor in Striated Muscle by Sex Steroids.
N. E. Rance, and S. E. Max. 1982, 20p NAS 1.26:174173, NASA-CR-174173
Contract NAG2-100

The influence of orchiectomy (GDX) and steroid administration on the level of the cytosolic androgen receptor in the rat levator ani muscle and in rat skeletal muscles (tibialis anterior and extensor digitorum longus) was studied. Androgen receptor binding to muscle cytosol was measured using H-3 methyltrienolone (R1881) as ligand, 100 fold molar excess unlabeled R1881 to assess nonspecific binding, and 500 fold molar excess of triamcinolone acetonide to prevent binding to glucocorticoid and progestin receptors. Results demonstrate that modification of the levels of sex steroids can alter the content of androgen receptors of rat striated muscle. Data suggest that: (1) cytosolic androgen receptor levels increase after orchiectomy in both levator ani muscle and skeletal muscle; (2) the acute increase in receptor levels is blocked by an inhibitor of protein synthesis; and (3) administration of estradiol-17 beta to castrated animals increases receptor binding in levator ani muscle but not in skeletal muscle.

514,643
PAT-APPL-6-548 849/GAR PC A02/MF A01
National Institutes of Health, Bethesda, MD.
Saponin-Based Polyether Polyols.
Patent Application.
Filed 4 Nov 83, 24p PB85-143832
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The invention provides a method for solubilizing digitonin and digitonin-related saponins comprising alkoxylating the saponin starting material with conventional alkoxylation agents such as alkylene oxides or diglycidyl ethers. The product saponin-based polyether polyols have low toxicity, high solubility, and a decreased capacity for forming insoluble complexes with cholesterol. The adducts of the present invention further have particular application for solubilization of lipophilic pharmaceuticals and suppression of mycoplasmas in cell cultures.

6P. Physiology

514,644
AD-A148 889/9/GAR PC A02/MF A01
New Mexico Univ., Albuquerque. School of Medicine.
Effect of Inert Gases on Ion Transport Across the Erythrocyte Membrane.
Final rept. 1 Jun 76-31 May 84,
W. R. Galey. 18 Dec 84, 21p
Contract N00014-76-C-0815

Hyperbaric argon stimulates active transport of sodium and potassium in the human erythrocyte. These increases in active uptake of potassium and active extrusion of sodium from the cell are related to the partial pressure of the ENG. Moderate hydrostatic pressures (as exerted through helium, an ENNG) depress active transport in these same cells. This depression is seen under hyperbaric pressures of argon-helium mixtures to exert an effect proportional to the pressure exerted. Nitrogen, a less potent ENG than argon, increases active transport across cell membranes but to a lesser degree. This shows again the parallel between the behavioral actions of hyperbaric ENGs and their effects on cell membrane ion transport. Although active transport is stimulated by ENGs and inhibited by pressure, the ability of Na-K, ATPase (the transport enzyme) of cell membranes to hydrolize ATP is not affected by these conditions. This suggests that the effects of pressure and ENGs may be on the stochiometry or efficiency of the pump rather than on its activity per se.

514,645
AD-A148 912/9/GAR PC A02/MF A01
Clemson Univ., SC. Dept. of Psychology.
Multiple Resources and Brain Laterality.
Final rept. 1 May 83-1 May 84,
E. H. Galluscio. 6 Jun 84, 24p AFOSR-TR-84-1125
Grant AFOSR-83-0155

Two studies were completed to test the multiple resources model of information processing using tachistoscopic lateralized-input techniques. In Exp. 1 37 normal, dextral subjects, 18 men aged 18-21yr. and 19 women 18-21yr. responded manually to a visuo-spatial and verbal dual-task presented simultaneously to left and right brain or non-laterally. Both men and women tended to have superior performance with coherent lateral input. However, differences in task difficulty and the possibility of a left to right scanning advantage with lateral input made interpretation of the data tenuous. In the second experiment the difficulty of the two tasks were made more equal and a third viewing condition, having noncoherent lateral input, was included. Twenty normal, dextral subjects 10 men aged 18-21yr, and 10 women 19-21yr. were tested under all three viewing conditions. Both men and women had superior performance with coherent lateral input compared to the other two viewing condition. The results were viewed as supporting the notion that each hemisphere has separate and unique pools of resources, that the resources of one or both hemispheres may be functional in processing a given task, and that in dual-task situations the brain operates most efficiently accurately with direct access of appropriate tasks to each hemisphere. (Author)

514,646
AD-A148 914/5/GAR PC A08/MF A01
Pittsburgh Univ., PA.
Conference on Dynamics of Cholinergic Function: Acetylcholine in Health, Disease and Aging Held at Oglebay Park, West Virginia on 31 October-4 November 1983.
Final rept. 1 Apr 83-31 Mar 84,
I. Hanin. Apr 84, 173p
Grant DAMD17-83-G-9534

Proceedings and Program for 1983 Conference on Dynamics of Cholinergic Function are presented.

514,647
AD-A148 923/6/GAR PC A02/MF A01
Naval Submarine Medical Research Lab., Groton, CT.
Effect of Extreme Peripheral Light on Dark Adaptation.
Interim rept.,
S. M. Luria, and J. DiVita. 16 Nov 84, 16p Rept no. NSMRL-1039

The effects of dark adaptation of light leaking around the edges of a spectacle frame worn under ambient light levels of 0.4 and 15 foot-Lamberts for 0.5 to 5 minutes were measured. Younger observers were virtually unaffected by light leaks in ambient illumination of 0.4 fL. However, after 5 minutes in ambient illumination of 15 fL, they required about 45 seconds to recover complete dark adaptation, and observers over the age of 40 required nearly three minutes. Originator-supplied keywords include: Night vision and Effect of peripheral vision on dark adaptation.

514,648
AD-A148 929/3/GAR PC A02/MF A01
Walter Reed Army Inst. of Research, Washington, DC.
Chloride Movement Across Basolateral Membrane of Necturus Epithelium,
R. S. Fisher. 1984, 8p
Pub. in American Jnl. of Physiology, v247 n16 pC495-C500 1984.

No abstract available.

514,649
PB85-142727/GAR PC A02/MF A01
Washington Univ., Seattle. Center for Bioengineering.
Tests of the Application of the Radioactive Microsphere Technique to the Measurement of Regional Myocardial Blood Flow,
R. B. King, and J. B. Bassingthwaighte. Dec 84, 14p UW/BIOENG-84/1
Contract N01-HL-1-9135

The radioactive microsphere technique is tested for its applicability to the measurement of regional myocardial blood flow in the conscious baboon. Tests undertaken were: (1) the reproducibility of microsphere deposition densities, (2) recirculation of microspheres, (3) the effects of microsphere size and injection site on local microsphere depositions, (4) comparison of temporally separated injections, and (5) the effects of the statistics of microsphere distribution and of the fineness of piece-mealing on the apparent dispersion of local flows.

514,650
PB85-144087 Not available NTIS
North Carolina Univ. at Chapel Hill. School of Medicine.
Effect of Ventilation and Perfusion Imbalance on Inert Gas Rebreathing Variables.
Journal article,
M. Friedman, S. A. Wilkins, A. F. Rothfeld, and P. A. Bromberg. c1984, 7p EPA/600/J-84/170
Grant EPA-R-805184
Pub. in Jnl. of Applied Physiology, v56 n2 p364-369 1984.

The effects of ventilation-to-perfusion (Va/Qc) maldistribution within the lungs on measured multiple gas rebreathing variables were studied in 14 dogs. The rebreathing method (using He, C18C, and C2H2) allows for measurements of pulmonary capillary blood flow (Qc), diffusing capacity (DLco), lung gas volume, and the combined pulmonary tissue and capillary blood volume (VTPC). Va/Qc imbalance was created by reversibly occluding the right main pulmonary artery or by reversibly obstructing the left main bronchus in eight dogs. Six additional dogs were ventilated with 10 cmH2O positive end-expiratory pressure (PEEP) to create a bimodal distribution of Va/Qc within the lungs. No significant alterations in computed rebreathing variables, except for a small (14%) decrease in DLco, occured during right main pulmonary artery occlusion, whereas obstruction of the left main bronchus caused parallel decreases (mean of 46%) in all rebreathing variables.

6Q. Protective Equipment

514,651
PB85-854784/GAR PC N01/MF N01
National Technical Information Service, Springfield, VA.
Helmets: Construction, Effectiveness, and Human Factors. 1970-February 1985 (Citations from the NTIS Data Base).
Rept. for 1970-Feb 85.
Feb 85, 159p
Supersedes PB83-804377.

This bibliography contains citations concerning protective helmets used by motorcyclists, firefighters, infantry, flightcrews, and underwater divers. Topics include materials considerations, design aspects, cooling devices, performance evaluations, and testing of specific helmets. Helmet-mounted devices, including sights and visors, and helmets used in industry are also discussed. (This updated bibliography contains 196 citations, 21 of which are new entries to the previous edition.)

6R. Radiobiology

514,652
AD-A148 866/7/GAR PC A03/MF A01
Texas Univ. Health Science Center at San Antonio. Dept. of Radiology.

Genetic Effects of Microwave Exposure on Mammalian Cells In Vitro. Volume 2. Appendix A. Cytogenetics and Growth Kinetics Data, 850 MHz.
Annual rept. 1 Jul 81-30 Sep 82,
M. L. Meltz, C. R. Harris, and K. A. Walker. Oct 84, 44p USAFSAM-TR-84-24-APP-A
Contract F33615-80-C-0607
See also Volume 2, Appendix B, AD-A148 867.

This work is a continuation of studies designed to answer the question of whether radiofrequency radiation (RFR) at lower power levels (no greater than 10 mW/sq cm), where measurable heating in the exposure system cannot be detected, causes any transient or permanent alteration in series of subtle biochemical processes elicited in the DNA of mammalian cells. The specific process(es) being studied are: the effects of RFR on repair synthesis in normal human fibroblasts after ultraviolet light damage of the DNA; and the possible induction by RFR of sister chromatid exchanges or chromosome aberrations in Chinese Hamster Ovary cells. Additional information obtained in the latter studies includes any effects on cell viability (by cloning efficiency) or on cell growth (increase in cell number).

514,653
AD-A148 867/5/GAR PC **A04/MF A01**
Texas Univ. Health Science Center at San Antonio. Dept. of Radiology.
Genetic Effects of Microwave Exposure on Mammalian Cells In Vitro. Volume 2. Appendix B. Cytogenetics and Growth Kinetics Data, 1.2 GHz.
Annual rept. 1 Jul 81-30 Sep 82,
M. L. Meltz, C. R. Harris, and K. A. Walker. Oct 84, 70p USAFSAM-TR-84-24-APP-B
Contract F33615-80-C-0607
See also Volume 1, AD-A145 946.

This work is a continuation of studies designed to answer the question of whether radiofrequency radiation (RFR) at lower levels (no greater than 10 mW/sq cm), where measurable heating in the exposure system cannot be detected, causes any transient or permanent alteration in a series of subtle biochemical processes elicited in the DNA of mammalian cells. The specific process(es) being studied are: the effects of RFR on repair synthesis in normal human fibroblasts after ultraviolet light damage of the DNA; and the possible induction by RFR of sister chromatid exchanges or chromosome aberrations in Chinese Hamster Ovary cells. Additional information obtained in the latter studies includes any effects on cell viability (by cloning efficiency) or on cell growth (increase in cell number).

514,654
AD-A148 977/2/GAR PC **A02/MF A01**
Texas Univ. at Austin. Dept. of Biomedical Engineering.
Measurement and Prediction of Thermal Injury in the Retina of the Rhesus Monkey,
A. J. Welch, and G. D. Polhamus. Oct 84, 13p USAFSAM-TR-83-307
Contract F33615-76-C-0605
Pub. in IEEE Transactions on Biomedical Engineering, vBME-31 n10 p633-644 Oct 84.

No abstract available.

514,655
DE85000841/GAR PC **A02/MF A01**
Battelle Pacific Northwest Labs., Richland, WA.
Portable Microdosimetry System.
L. A. Braby, C. A. Ratcliffe, and N. F. Metting. Aug 84, 11p PNL-SA-12540, CONF-8409161-1
Contract AC06-76RL01830
Symposium on neutron dosimetry, Munich, F.R. Germany, 17 Sep 1984.
Portions are illegible in microfiche products.

Tissue equivalent proportional counters simulating solid volumes a few micrometers in diameter make exceptionally versatile neutron detectors. Since they are nearly tissue equivalent, the energy deposited in the detector is a good measure of the dose in tissue. The well known relationships between microdosimetric parameters and linear energy transfer provide several convenient options for calculating dose equivalent. However, this technique has found only very limited application in routine dosimetry due to the complexity of the electronics and of the spectral information collected. Recent developments in microelectronics combined with improved techniques for building proportional counters have now made it possible to develop a fully automated portable proportional counter system. A prototype device based on these principles has been developed for NASA as a potential space shuttle experiment. This system includes separate detectors and electronics to measure dose and the fluence of high energy heavy ions. Use of an internal alpha particle source provides reliable energy calibration so that the precision of dose measurements can be checked frequently. The dose monitoring detector simulates a 2 mu m diameter sphere. The electronics system includes a low noise charge-sensitive preamplifier housed in the detector base, two analog-to-digital converters with amplifier gains differing by a factor of twenty, a pair of 128 channel memories and a CMOS microcomputer which controls the system and automatically calculates dose and dose equivalent. In order to simplify the calculations, the detector gain is automatically maintained at a preset value by adjusting the anode voltage. (ERA citation 10:003199)

514,656
DE85002437/GAR PC **A02/MF A01**
Los Alamos National Lab., NM.
X-Ray Holography of Biological Specimens.
J. C. Solem. 1984, 11p LA-UR-84-3340, CONF-840783-3
Contract W-7405-ENG-36
International congress on photobiology, Philadelphia, PA, USA, 3 Jul 1984.
Portions are illegible in microfiche products.

The author reviews the reasons for x-ray imaging of biological specimens and the techniques presently being used for x-ray microscopy. The author points out the advantages of x-ray holography and the difficulties of obtaining the requisite coherence with conventional sources. The author discusses the problems of radiation damage and the remarkable fact that short pulse x-ray sources circumvent these problems and obtain high-resolution images of specimens in the living state. Finally, the author reviews some of the efforts underway to develop high-intensity coherent x-ray sources for the laboratory. 14 references, 5 figures, 2 tables. (ERA citation 10:003216)

514,657
NUREG/CR-3984/GAR PC **A02/MF A01**
Lovelace Biomedical and Environmental Research Inst., Albuquerque, NM. Inhalation Toxicology Research Inst.
Biological Characterization of Radiation Exposure and Dose Estimates for Inhaled Uranium Milling Effluents - Annual Progress Report, April 1, 1983-March 31, 1984.
Technical rept.,
A. F. Eidson. Jan 85, 25p LMF-111
See also NUREG/CR-3745.

The problems addressed are the protection of uranium mill workers from occupational exposure to uranium through routine bioassay programs and the assessment of accidental worker exposures. Chemical properties of refined uranium ore (yellowcake) and uranium distribution patterns among organs are compared. These studies will facilitate calculations of organ doses for potential exposures and will identify important bioassay procedures. Results of studies in rats to investigate retention of yellowcake in a wound showed that retention of less soluble yellowcake from the body was significantly more prolonged than of more soluble yellowcake. Histological observations showed kidney damage that appeared 4 to 8 days after exposure to the more soluble yellowcake with repair occurring by 64 days after exposure. The concentration of uranium in kidney was 8-17 micrograms U/g kidney at 4-8 days after exposure. No evidence of kidney damage was observed in dogs exposed to the less soluble yellowcake form.

6S. Stress Physiology

514,658
AD-A148 845/1/GAR PC **A03/MF A01**
Army Research Inst. of Environmental Medicine, Natick, MA.
Skeletal Muscle Metabolism during Exercise is Influenced by Heat Acclimation,
A. J. Young, M. N. Sawka, L. Levine, B. S. Cadarette, and K. B. Pandolf. 13 Dec 84, 32p Rept no. USARIEM-M-10/85

The influence of heat acclimation on skeletal muscle metabolism during sub-maximal exercise was studied in 13 healthy men. The subjects performed 30 min of cycle exercise (70% of individual maximal oxygen uptake) in a cool (21 deg C, 30% rh) and a hot (49 deg C, 20% rh) environment both before and again after they were heat acclimated. Aerobic metabolism was lower (P 0.01) in the heat as compared to the cool both before and after heat acclimation. Anaerobic metabolism (indicated by changes in muscle and blood lactate) was increased (P 0.01) in the hot relative to the cool environment, both before and after acclimation. Acclimation lowered (P 0.01) aerobic and anaerobic metabolism in both environments. Despite higher respiratory exchange ratios (R) in the heat, the amount of muscle glycogen utilized during exercise did not differ from that in the cool, either before or after acclimation. However, muscle glycogen utilization and R were reduced in both environments following acclimation. These findings show that: (a) anaerobic muscle metabolism increased to compensate for a decreased aerobic metabolism during exercise in the heat; (b) muscle glycogen is not the carbohydrate substrate for the increased muscle lactate production during exercise under extreme heat stress; and (c) heat acclimation lowers both the aerobic and anaerobic rate of metabolism during exercise in a cool as well as a hot environment.

514,659
AD-A148 846/9/GAR PC **A03/MF A01**
Army Research Inst. of Environmental Medicine, Natick, MA.
Assessment of Muscle Strength and Prediction of Lifting Capacity in U.S. Army Personnel,
J. E. Wright, D. S. Sharp, J. A. Vogel, and J. F. Patton. 5 Dec 84, 46p Rept no. USARIEM-M-9/85

The purpose of this study was to determine muscular strength tests which would be appropriate for Army occupational selection and predictive of job lifting and lifting-carrying tasks. A maximum lift to 132 cm, dead lift to knuckle height and a short term self-paced maximal lift-and-carry were utilized as criterion tasks. Isometric strength measures evaluated as predictors included: handgrip, knee extension, trunk extension, upper torso arm-shoulder pull down, standing upward pull at 38 cm and 132 cm height. Dynamic strength of the trunk extensors were also measured with an isokinetic dynamometer. Studies employed both male and female soldiers. Initial analysis selected six isometric strength measures plus lean body mass as potential predictors of the best criterion variable, maximum lift capacity to 132 cm (MSLC). Males and females formed separate populations (non-coincidence) in these measures so that gender could be represented by a numerical designator as a constituent variable in a single predictive equation. Handgrip, 38cm upright pull and upper torso pull down gave similar predictive power. Ridge regression techniques were utilized to compensate for multicollinearity effects among these predictors.

514,660
AD-A148 847/7/GAR PC **A02/MF A01**
Army Research Inst. of Environmental Medicine, Natick, MA.
Food Deprivation and Exercise in the Heat: Thermoregulatory and Metabolic Effects,
R. P. Francesconi, and R. W. Hubbard. 5 Dec 84, 25p Rept no. USARIEM-M-8/85

To determine the effects of food deprivation on the physical, physiological, and metabolic responses to exercise in the heat, adult, male rats (330-360 g, N=16/group) were food-deprived for 24, 48, or 72h. They were then exercised (9.14m/min) in the heat (35.5 deg C) to hyperthermic exhaustion (Tco approx. 43 deg C). Food deprivation had no effects on endurance, but ad lib fed controls manifested sig.ificantly (P < or = .05) increased Tco and Tsk during the latter portion of the treadmill interval. Prolonged food deprivation (48 and 772h) resulted in significant (P < or = .01) hypertriglyceridemia and hyperlactacidemia subsequent to exercise. Levels of sodium, potassium, urea nitrogen, and creatine phosphokinase were unaffected by the food deprivation intervals. We have concluded from these studies that while several thermoregulatory and metabolic responses to exercise in the heat can be significantly affected by food deprivation, short-term endurance capacity was unaltered.

514,661
AD-A148 848/5/GAR PC **A02/MF A01**
Army Research Inst. of Environmental Medicine, Natick, MA.

Hemodynamics Responses to Upright Tilt at Sea Level and High Altitude,
C. S. Fulco, and A. Cymerman. 12 Dec 84, 25p Rept no. USARIEM-M-11/85

Absolute and compensatory responses to a circulatory challenge were studied by determining the changes occurring in heart rate (HR), stroke volume (SV), cardiac output (CO), calf blood flow (CBF) blood pressure (BP), total peripheral resistance (TPR), plasma norepinephrine (Nor) and blood volume (BV). Eight young men were tested at sea level (SL)); after 1h at 4300m simulated altitude (SA); and at 18h, 66h and 114h during residence at 4300m (HA). HR, SV, CO, CBF, TPR and BP were obtained during supine rest and after 13 min of 60 deg head-up tilt, using an impedance monitor and an electrosphygmomanometer. With continued exposure, SV, CO, TPR, and CBF responses were reduced ($p<or=.05$). These reductions were associated with a 10% decline in BV ($p<or=.01$) and a 40% increase in Nor ($p<or=.05$). It is concluded that the reduction in SV during tilt at SL and SA is compensated for by an increase in HR and TPR in order to maintain BP. After 18h HA, BP is maintained by an increase in HR and a greater and more prolonged venoconstriction.

514,662

AD-A148 883/2/GAR PC **A02/MF A01**
Naval Submarine Medical Research Lab., Groton, CT.
Relative Effectiveness of Red and White Light for Subsequent Dark-Adaptation.
Interim rept.,
S. M. Luria, and D. A. Kobus. 3 Jul 84, 25p Rept no. NSMRL-1036

The literature concerning the effectiveness of red and white light for permitting subsequent dark-adaptation is reviewed. Although red light is clearly superior to white, its advantage decreases as intensity decreases, and at levels of ambient light found in submarine compartments, its superiority over white is probably not of practical significance in most situations. Considering the disadvantages of red light, it is concluded that low level white light is preferable to red light as general night-time ambient illumination.

514,663

AD-A149 034/1/GAR PC **A12/MF A01**
Academy of Health Sciences (Army), Fort Sam Houston, TX. Health Care Studies Div.
Proceedings: Second User's Workshop on Combat Stress Held at Fort Sam Houston, Texas on 29-30 April 1982.
Final rept. for period ending Apr 82,
A. D. Mangelsdorff, and T. P. Furukawa. Dec 83, 261p Rept no. HCSD-CR-83-004

The Proceedings document the workshop presentations and group reports. Combat stress casualties were analyzed for their historical significance. Recommendations to correct deficiencies in combat psychiatry and mental health services were discussed. The factors influencing combat behavior were examined as well as the functions of those dealing with combat stress casualties.

514,664

AD-A149 035/8/GAR PC **A11/MF A01**
Academy of Health Sciences (Army), Fort Sam Houston, TX. Health Care Studies Div.
Proceedings: Third User's Workshop on Combat Stress; Cohesion Held at Fort Sam Houston, Texas on 21-23 September 1983.
Final rept. for period ending Oct 83,
A. D. Mangelsdorff, J. M. King, and D. E. O'Brien. Dec 83, 234p Rept no. HCSD-CR-84-001

The Proceedings document the workshop presentations and group reports. Combat stress casualties were analyzed for their historical significance. The role of cohesion in the prevention of combat stress reactions was examined. The elements of cohesion were identified. Discussion of how to develop cohesion are summarized.

514,665

AD-A149 077/0/GAR PC **A02/MF A01**
Tulane Univ., Covington, LA. Delta Regional Primate Research Center.
Biomechanical Studies of Impact Acceleration Research.
Final technical rept.,
P. J. Gerone. 15 Dec 84, 8p
Contract N00014-77-C-0305

Nonhuman primates were maintained for studies on the biomechanics of acceleration impact research by Navy personnel at Navy facilities. At one time or another during the course of this contract a total of 32 nonhuman primates were housed for the Navy. This included 13 chimpanzees (Pan troglodytes) and 19 rhesus monkeys (Macaca mulatta). Twelve of the 13 chimpanzees were still available at the close of this contract. One of the chimpanzees died on January 24, 1983. The rhesus monkeys remained on the contract until they were transferred to Navy facilities on March 1, 1984.

514,666

PB85-145894/GAR PC **E04/MF E01**
Foersvarets Forskningsanstalt, Stockholm (Sweden).
Baerandet av Last i Militaerhistoriskt och Fysiologiskt Perspektiv - En Litteraturstudie (Military History and Physiology of Load Carriage - A Survey of Literature,
H. Roberthson. Nov 84, 32p FOA-C-54059-H1
Text in Swedish.

The literature can be said to regard load carriage from three aspects, namely historical, energetical and 'mechanical'. The first one involves descriptions of what the armies throughout the history have been carrying, and how the loads have been carried. Army efficiency versus load is also discussed. The energetic aspect, which is the most common, involves energy cost for different situations, i.e. varying load, velocity, mode of carrying etc. Mechanical influence of the load on body and agility is the third aspect on load carriage. Included here are the discussions about risks of injuries due to heavy loads.

6T. Toxicology

514,667

AD-A148 868/3/GAR PC **A05/MF A01**
Brookhaven National Lab., Upton, NY.
Inhalation Toxicity of Manganese Dioxide and a Magnesium Oxide-Manganese Dioxide Mixture.
Final rept. Nov 82-Jun 83,
R. N. Shiotsuka. Sep 84, 78p Rept no. BNL-35334

This report describes: (1) The development, characterization and use of a fluidizing bed aerosol generator; (2) Characterization of the mass and particle size distribution of aerosolized manganese dioxide (MnO_2) in 1.4 cu m inhalation chambers; and (3) The results of a range-finding inhalation toxicity study of rats exposed to manganese dioxide dust. The major biologic response observed in the range-finding study was the suggestion of long-term pulmonary fibrosis. Recommendations of doses and biologic endpoints for a subchronic study are made.

514,668

AD-A148 936/8/GAR PC **A02/MF A01**
Army Medical Research Inst. of Infectious Diseases, Fort Detrick, MD.
Anthrax Toxin,
S. H. Leppla, B. E. Ivins, and J. W. Ezzell. 26 Oct 84, 16p

Anthrax toxin is a key virulence factor of Bacillus anthracis. The three protein components of the toxin have been purified and shown to have similar molecular weights: protective antigen (PA), 85,000; lethal factor (LF), 83,000; edema factor (EF), 89,000. The edema factors acts by reusing the concentration of cAMP in animal cells, and subsequently EF was found to be a calmodulin-dependent adenylate cyclase. The similarity of EF to Bordetella pertussis and eukaryotic cyclases suggests that the anth;rax EF gene may have originated in animals. The lethal factor causes death in rats in as little as 38 minutes. No cultured cells are known which are rapidly damaged by LF.

514,669

AD-A148 952/5/GAR PC **A02/MF A01**
California Univ., Irvine.
Acute Toxicity of Thionyl Chloride Vapor for Rats.
Technical rept. Jun-Sep 84,
E. R. Kinkead, and R. L. Einhaus. 19 Nov 84, 13p
AFAMRL-TR-84-069
Contract F33615-80-C-0512

Rats were exposed to thionyl chloride vapor for one hour to determine the acute inhalation toxicity of this compound. The thionyl chloride was completely hydrolyzed to sulfur dioxide and hydrogen chloride gases when evaporated in air. The calculated LD50 expressed as thionyl chloride was 500 ppm for a one hour single exposure and the acute toxicity of the hydrolyzed mixture was comparable to a theoretical calculation for additive effects of the mixture. The acute toxicity of thionyl chloride appears to be much lower than previously reported.

514,670

PB85-142016/GAR PC **A13/MF A01**
Clement Associates, Inc., Arlington, VA.
Review and Evaluation of the Evidence for Cancer Associated with Air Pollution.
Final rept.,
I. C. T. Nisbet, M. A. Schneiderman, N. J. Karch, and D. M. Siegel. 7 Nov 84, 295p EPA/450/5-83/006R
Contract EPA-68-02-3396
Supersedes PB84-164078.

This final report is a comprehensive summary and compilation of the scientific evidence related to the hypothesis that cancer rates in human populations are associated with their exposure to pollutants present in the ambient air. Critical comments on the strength and weaknesses of the studies are presented and general methodological problems in the conduct and interpretation of the studies are discussed. No overall judgments about the weight of the entire body of scientific evidence are presented.

514,671

PB85-144079 Not available NTIS
Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Biology.
Effects of Cadmium on the Population Growth of a Benthic Invertebrate Aeolosoma Headleyi (Oligochaeta).
Journal article,
B. R. Niederlehner, A. L. Buikema, C. A. Pittinger, and J. Cairns. c1984, 10p EPA/600/J-84/182
Grant EPA-R-807932
Pub. in Environmental Toxicology and Chemistry, v3 n2 p255-262 1984.

A chronic toxicity test using population growth of an aquatic oligochaete, Aeolosoma headleyi, was evaluated for usefulness in determining the hazard of chronic exposures to cadmium. Tests were conducted in artificial hard water (180 mg/L hardness) and dechlorinated tap water (60 mg/L hardness). After 10 to 14 d of exposure, there were significant differences between groups in population growth rate or number of worms in both water types. The no-observable-effects concentrations (NOEC) for replicate tests in artificial hard water were 32.0 and 53.6 micrograms/L cadmium. The 48-h LC50 in artificial hard water was 4,980 micrograms/L, yielding acute/chronic ratios of 155 and 92, respectively. The oligochaete was more sensitive in the softer dechlorinated tap water, with a NOEC of 17.2 micrograms/L cadmium and a 48-h LC50 of 1,200 micrograms/L. The acute/chronic ratio was 70. Dose-response curves were linear at higher concentrations, but stimulation of reproduction was noted at low concentrations.

514,672

PB85-144103/GAR PC **A02/MF A01**
Corvallis Environmental Research Lab., OR.
Biological Methods for Determining Toxicity of Contaminated Freshwater Sediments to Invertebrates.
Journal article,
A. V. Nebeker, M. A. Cairns, J. H. Gakstatter, K. W. Malueg, and G. S. Schuytema. 1984, 17p EPA/600/J-84/184
Pub. in Environmental Toxicology and Chemistry, v3 p617-630 Oct/Dec 84.

Methods are presented for using Daphnia magna, Hyalella azteca, Gammarus lacustris, Chironomus tentans and Hexagenia limbata to screen freshwater sediments for acute and chronic toxicity, bioaccumulation potential and in situ toxicity. The 48-h Daphnia tests are recommended as inexpensive, uncomplicated and

sensitive acute methods. Hyalella and Chironomus are the recommended test organisms as they are easy to rear and test, they remain in intimate contact with the sediment and they exhibit high control survival. Verification studies evaluating the recommended methods and organisms are briefly summarized.

514,673

PB85-144798/GAR PC **A05**/MF **A01**
Research Triangle Inst., Research Triangle Park, NC.
Di(n-Butyl) Phthalate: Reproduction and Fertility Assessment in CD-1 Mice When Administered in the Feed.
Final rept.,
J. R. Reel, A. D. Lawton, and J. C. Lamb. 28 Nov 84, 100p RTI-116, NTP-84-411
Contract NO1-ES-2-5014

Di(n-butyl) phthalate (DBP) was evaluated in a new reproductive toxicology testing scheme which has been designated 'Fertility Assessment by Continuous Breeding'. In the present study, Task 1 (dose range-finding) was not performed since sufficient data were available in the literature to select dose levels for Task 2 (continuous breeding).

514,674

PB85-149714/GAR PC **A09**/MF **A01**
Roth (H. Daniel) Associates, Inc., Rockville, MD.
NO2 and Health Effects: Analysis of Selected Studies. Phase 2.
Final rept. Nov 81-Oct 82,
H. D. Roth, and E. Post. 1982, 179p GRI-84/0233
Contract GRI-5080-351-0353
See also PB83-126243.

Several studies have directly or indirectly addressed the issue of whether an association exists between gas cooking and health. Some studies have looked directly at gas ranges while others have examined a possible relationship between NO2 and adverse health effects. This latter type of study is important to the gas industry because low levels of NO2 are a known by-product of gas range cooking. This report evaluates nine health effects studies concerning the gas range issue. Five of these deal directly with the issue of adverse health effects associated with gas cooking and four deal with the general NO2/health effects issue. In assessing these studies, several criteria were applied, including examination of design protocols, statistical models used to analyze the data, and interpretations given to statistical results. In addition, in cases where the raw data were available for analysis, they were subjected to alternative statistical tests. Our general finding from these analyses is that no conclusive link exists between gas cooking and health.

7. CHEMISTRY

7A. Chemical Engineering

514,675

DE85000420/GAR PC **A02**/MF **A01**
Monsanto Research Corp., Miamisburg, OH. Mound.
Production of HD Gas by Controlled Reaction of LiAlD sub 4 and H sub 2 O.
R. W. Baker. 9 Oct 84, 6p MLM-3193
Contract AC04-76DP00053

HD gas of approximately 98% purity has been produced by the controlled reaction of lithium tetradeuteridoaluminate, LiAlD sub 4 , and water using a vacuum/gas rack system. (ERA citation 10:001013)

514,676

DE85000869/GAR PC **A02**/MF **A01**
Utah Univ., Salt Lake City. Dept. of Chemistry.
Field-Flow Fractionation in the Analysis of Energy Related Materials. Progress Report, February 1, 1984-January 31, 1985.
J. C. Giddings. Oct 84, 10p DOE/EV/10244-6
Contract AC02-79EV10244

In pursuit of increased accuracy in our particle characterization efforts, we have continued to focus our attention on methods which yield simultaneous information of size and density, as well as on means to precisely control vital experimental parameters. Thus, measurements of channel void volumes and flow rates have been studied in detail. Efforts to enhance resolution in steric field-flow fractionation have led to the construction of new equipment, and the concept of a novel separation technique for particle fractionation and characterization in the steric regime has been presented. (ERA citation 10:000962)

514,677

DE85001482/GAR PC **A03**/MF **A01**
Southwest Research Inst., San Antonio, TX.
Photosynthesis of Ammonia.
W. A. Mallow. 24 Sep 84, 36p DOE/SF/11939-T1
Contract AC03-83SF11939
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This study has demonstrated the technical feasibility of producing ammonia using an innovative technique of combining air, water and sunlight. The technique involves passing moist air over a catalyst-doped, open-celled silica foam bed illuminated by concentrated sunlight. A catalytic reaction results in tounts of ammonia. The work summarized in this report included testing of a pilot (small scale) ammonia production system located on the roof of a Southwest Research Institute (SwRI) Laboratory located in San Antonio, Texas. The system consisted of a catalyst foam bed located in a glass tube about three meters long and 5 centimeters in diameter and mounted on the focal line of a parabolic trough solar collector focused at the sun. The primary active ingredient in the catalyst was titanium dioxide. Moist air was blown through the glass tube, over illuminated catalyst foam bed. A catalytic reaction took place in the foam bed resulting in the production of ammonia gas. The ammonia gas was bubbled through a water scrubber where the ammonia was dissolved. The ammonia concentration in the scrubber water was then measured using chemiluminescence and spectrophotometry techniques to determine the ammonia production rate. Thirty-one tests were conducted in the roof top facility. A number of important process parameters were evaluated. The ammonia production rate from these tests varied from several milligrams per hour to a few micrograms per hour. The tests showed that ammonia production was possible although the yields were relatively low. Several aspects of the process could be improved to increase the yield rates. Specifically, better techniques for illuminating the catalyst with concentrated sunlight and for providing moisture at the catalyst surface should enhance the ammonia production rate. 13 references, 7 figures, 1 table. (ERA citation 10:002060)

514,678

DE85002611/GAR PC **A02**/MF **A01**
Ames Lab., IA.
Molten Salt Reactor for Dispersed Solid Phase Chlorination.
M. S. Dobbins, and G. Burnet. 1984, 16p IS-M-515, CONF-841121-7
Contract W-7405-ENG-82
AIChE annual meeting, San Francisco, CA, USA, 25 Nov 1984.
Portions are illegible in microfiche products. Original copy available until stock is exhausted.

A unique reactor system for the high-temperature (400 exp 0 C to 700 exp 0 C), batch chlorination of finely-divided, mixed metal oxides dispersed in a NaCl-AlCl sub 3 melt is described. Provisions are made for operation under an inert atmosphere and for sampling of the heterogeneous melt and of the mixed metal chloride vapor product stream. Application of the reactor system to mineral recovery from coal conversion solid wastes is underway. 10 references, 5 figures. (ERA citation 10:001791)

514,679

DE85003173/GAR PC **A07**/MF **A01**
ERCO Petroleum Services, Inc., Houston, TX.
Produced Fluid Emulsions. Final Report.
C. F. Hurley, A. Himmelblau, and L. Trom. Sep 84, 135p DOE/BC/00046-25
Contract AC19-78BC00046
Portions are illegible in microfiche products.

Emulsion production and stabilization may be due to one or more of several phenomenon including water-oil ratio, oil and brine chemistry, and surfactant and polymer type and concentration. They may influence emulsification either independently or with dependence on one or more of the other factors. Task One has tried to define which factors are dominant and what effect variations in them will have on the emulsion characteristics for each of the fields investigated. Emulsions were produced using a hand homogenizer at a fixed setting for a specific length of time to ensure all samples were produced uniformly. A du Nouy apparatus was used to measure surface and interfacial tensions and a binocular microscope was used in the micro-visual studies. The emulsions were treated in a similar manner with a wide variety of materials to not only break them, but also to help define which mechanisms are responsible for the stabilization of a particular emulsion. Core floods in Task Two utilized a six-foot sand-pack for a mixing medium. A six-inch long Berea core which followed, provided shear similar to that of the reservoir. The choice of oil, brine, surfactant and polymer were chosen to correlate to the Task One studies. Similarities and differences in the results between the bench-top and core flood studies are noted. The conditions of emulsion production and characteristics and the effectiveness of emulsion breakers are compared to help determine the mechanism of emulsion stabilization. 8 figures, 85 tables. (ERA citation 10:001847)

514,680

PB85-151751 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Snapshot of the NBS (National Bureau of Standards) Center for Chemical Engineering.
Final rept.,
J. Hord. 1983, 9p
Pub. in Proceedings of the National Conference of Standards Laboratories 1983 Workshop and Symposium, Boulder, CO., July 18-21, 1983, pl-3.1--l-3.9.

The Center for Chemical Engineering was formed two years ago by the National Bureau of Standards to meet the changing needs of the U.S. chemical process industry. The goal of the Center is to provide U.S. industry with measurement and data bases that enable improved innovation, design, and control of chemical processes, assure equity in domestic and international trade, and strengthen the competitiveness of U.S. industry in the world market. This paper provides an overview of selected research efforts within the Center and of its test and calibration services and research products. Emphasis is placed on chemical process metrology, thermophysical properties of fluids and solids, and chemical engineering science.

7B. Inorganic Chemistry

514,681

N85-13043/3/GAR PC **A05**/MF **A01**
Springborn Labs., Inc., Enfield, CT.
Development of Acceptance Criteria for Batches of Silane Primer for External Tank Thermal Protection System Bonding Applications.
Monthly Progress Reports, 1 Aug. - 31 Oct. 1984.
F. Mikes. 2 Dec 84, 89p NAS 1.26:171266, MPR-7, NASA-CR-171266
Contract NAS8-35818

Silane primers for use as thermal protection on external tanks were subjected to various analytic techniques to determine the most effective testing method for silane lot evaluation. The analytic methods included high performance liquid chromatography, gas chromatography, thermogravimetry (TGA), and fourier transform infrared spectroscopy (FTIR). It is suggested that FTIR be used as the method for silane lot evaluation. Chromatograms, TGA profiles, bar graphs showing IR absorbances, and FTIR spectra are presented.

7C. Organic Chemistry

514,682

AD-A148 980/6/GAR PC **A02**/MF **A01**

Kentucky Univ., Lexington. Dept. of Chemistry.
Boron Derivatives of 3-Methylpyrazole.
Interim technical rept.,
K. Niedenzu, P. M. Niedenzu, and K. R. Warner. Dec 84, 15p Rept no. UK/DC/TR-5
Contract N00014-83-K-0611

The reaction of KBH4 with Hpzme (= 3-methylpyrazole) can be directed to yield K(H2B(pzme)2), K(HB(pzme)3), or K(B(pzme)4), respectively, depending on the experimental conditions. All three salts are stereochemically pure with the methyl group being located exclusively in the 3-position of the pyrazole ring. In contrast, reaction of (CH3)3NBH3 with Hpzme yields a mixture of 1,5- and 1,7-dimethylpyrazabole. Similarly, reaction of K(H2B(pzme)2) with (CH3)3NBH2I produces a mixture of 1,5- and 1,7-dimethylpyrazabole, suggesting at least two different pathways for the latter process. In addition, the compounds 4,4,8,8-tetrabromo- and 4,4,8,8-tetrakis(3-methylpyrazole-1-yl)-1,5(7)-dimethylpyrazabole were also prepared. all compounds were characterized by NMR data.

514,683
AD-A149 042/4/GAR PC **A03/MF A01**
Texas Christian Univ., Fort Worth. Dept. of Chemistry.
Some Addition and Complexation Reactions of a Silylated Amino(Methylene)Phosphine.
Technical rept. for period ending 1984,
R. R. Ford, B. L. Li, R. H. Neilson, and R. J. Thoma. 12 Dec 84, 29p Rept no. TCU/DC/TR-84-08
Contract N00014-79-C-0632

The chemistry of phosphorus compounds containing Si-N-P and/or Si-C-P linkages is usually quite different from that of the nonsilylated analogues. On the one hand, the steric bulk and Pi acceptor properties of silyl groups can be used to kinetically stabilize a variety of low-coordinate phosphorus systems. Alternatively, the Si-N or Si-C bonds may serve as reactive sites so that processes such as intramolecular silyl group rearrangements and condensation reactions due to silane elimination are commonly found. These points are particularly well illustrated by the synthesis and reactivity of silylated ami no (methylene) phosphines. As a continuation of these studies, we report here several reactions which include some novel additions to the P-C double bond, metal complexation, and oxidative bromination. We were primarily interested in assessing the potential of compounds such as 1 as synthetic reagents in organonphosphorus and organometallic chemistry. A secondary objective of this study was to more closely compare the reactivity of 1 with its isoelectronic i mi nophosphine analogue, (Me3Si)2NP=NSiMe3.8.

514,684
AD-A149 066/3/GAR PC **A03/MF A01**
Texas Christian Univ., Fort Worth. Dept. of Chemistry.
Synthesis of Some Highly Silylated Aminophosphines and Their Reactions with Carbon Tetrachloride.
R. R. Ford, and R. H. Neilson. 12 Dec 84, 32p Rept nos. TCU/DC/TR-84-07, TR-84-07
Contract N00014-79-C-0632

In this paper, we report the synthesis and some CC14 reactions of a series of highly silylated aminophosphines which contain both the bis(trimethylsilyl)amino, (Me3Si)2N, and the bis(trimethylsilyl)methyl, (Me3Si)CH, substituents. Aside from interest in the general preparative chemistry of such hindered phosphines, a specific goal was to determine whether the alpha proton of the CH(SiMe3)2 group was accessible to attack by the CC13(-) anion. The resulting ylides (Me3Si)2N-P(Cl)(R)-C double bonded(SiMe3)2 might then be useful precursors to various low-coordinate phosphorus systems.

514,685
PAT-APPL-6-610 912/GAR PC **A02/MF A01**
Department of the Air Force, Washington, DC.
Method for Making Heterocyclic Block Copolymers.
Patent Application,
T. T. Tsai. Filed 16 May 84, 13p AD-D011 446/2
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

Thermally stable aromatic heterocyclic block copolymers are prepared by reacting a diamino monomer and terephthalic acid to form a carboxy-terminated rigid rod segment and then polymerizing a carboxy-monoamine monomer therewith to form flexible segments grafted onto the rigid rod segments. (Author).

7D. Physical Chemistry

514,686
AD-A148 982/2/GAR PC **A02/MF A01**
Eltron Research, Inc., Naperville, IL.
Two Photoelectrode Solid-State Photoelectrochemical Cell,
A. F. Sammells, and S. K. Schmidt. 14 Sep 84, 13p Rept no. 0002AE
Contract N00014-83-C-0108

The solid-state photoelectrochemical cell p-InP/C44H28N4Fe(+3) Porphine, Nafion 117/Nafion 117/(bpy)3Ru(2+), Nafion 117/n-Cds was prepared and given photopotentials in excess of 1100mV and appears to be a novel approach for not only specialized storage devices but also in specific detector applications.

514,687
AD-A148 995/4/GAR PC **A02/MF A01**
Kentucky Univ., Lexington. Dept. of Chemistry.
Structures of Three Pyrazaboles: 1,3,5,7-Tetramethylpyrazabole; 4,4-Bis(pyrazol-1'-yl)pyrazabole; 4,4,8,8-Tetrakis(pyrazol-1'yl)pyrazabole.
Interim technical rept.,
C. P. Brock, K. Niedenzu, E. Hanecker, and H. Noeth. Nov 84, 24p Rept no. UK/DC/TR-4
Contract N00014-83-K-0611

The structures of three pyrazaboles have been determined by single crystal x-ray diffraction. In all three structures the pyrazabole ring adopts a pronounced boat conformation. A comparison with the nine other known pyrazabole structures, however, shows that the central B2N2 ring is quite flexible, and that is observed conformation is sensitive to substituent and packing effects.

514,688
AD-A149 011/9/GAR PC **A02/MF A01**
Princeton Univ., NJ. Dept. of Chemical Engineering.
Orientation of Hydroquinone and Benzoquinone Adsorbed on Platinum Electrodes: Studies by Reflection-Absorption Infrared Spectroscopy,
K. P. Pang, J. B. Benziger, M. P. Soriaga, and A. T. Hubbard. 1984, 5p AFOSR-TR-84-1155
Grant AFOSR-82-0302
Pub. in Jnl. of Physical Chemistry, v68 n20 p4583-4586 1984.

No abstract available.

514,689
AD-A149 041/6/GAR PC **A03/MF A01**
Geo-Centers, Inc., Newton Upper Falls, MA.
Reaction of Oxygen-Nitrogen Mixtures with Granular Activated Carbons below the Spontaneous Ignition Temperature.
Aug 84, 29p Rept no. GC-TR-84-385
Contract N00014-83-C-2184

The presence of oxygen in the carbon network of gas adsorbent charcoals presents a research problem of long standing. Four pertinent topics now concerned with the oxygen-charcoal reactions are: a) activation of the adsorbent charcoals (manufacture), b) regeneration processes (applications), c) the spontaneous ignition temperature (safety considerations), and d) the use of charcoals as catalyst carriers and impregnation supports. It is desirable to have a deeper knowledge of the initial surface composition of a charcoal that is to be used in a specific process. Thermal desorption behavior can supply such information. The results to be reported cover three characteristic temperature-dependent phenomena: 1) an anomalous desorption in which a number of maxima occur in the concentrations of CO and CO2; 2) the formation of a surface barrier causing a decay in the CO and CO2 concentrations with the first-order rate constants at constant temperature; and 3) the attainment of a reproducible spontaneous ignition temperature (SIT) during programmed heating at a linear rate. These observations indicate a considerable complexity in the surface structure of an activated carbon.

514,690
AD-A149 084/6/GAR PC **A02/MF A01**
Columbia Univ., New York. Dept. of Chemistry.
Metal-Catalyzed Rearrangement of Alkene-Alkynes and the Stereochemistry of Metallacyclobutene Ring Opening.
Technical rept.,
T. J. Katz, and T. M. Sivavec. 27 Dec 84, 17p Rept no. TR-8
Contract N00014-79-C-0683

A molecular rearrangement is described that demonstrates how alkyl-metal-carbenes are generated when metal derivatives combine with acetylenes and olefins and shows that tungsten-carbenes not stabilized by heteroatoms insert into acetylenes. It reveals that this insertion can be remarkably stereo-selective. With catalytic amounts of carbene-tungsten carbonyls, biphenyls substituted at the 2 and 2' positions by vinyl and acetylene groups yield isomeric 9-vinylphenanthrenes. With stoichiometric amounts, they yield 9-vinylphenanthrenes whose structures contain the carbene moiety of the metal-carbene. (Author)

514,691
AD-A149 065/3/GAR PC **A02/MF A01**
Materials Research Labs., Ascot Vale (Australia).
Effects of Impurities and Additives on the Growth of Polycrystalline TNT,
W. S. Wilson. Feb 84, 20p Rept no. MRL-R-916

Growth of polycrystalline TNT on thermal cycling depends upon the presence of impurities in the TNT. Growth increases with the concentrations of 2,4-dinitrotoluene and 2,3,4-trinitroluene individually (these materials are major impurities in commercial TNT), and these materials have a synergistic effect on growth when they are present together. On the other hand paraffin wax and beeswax, commonly added as desensitisers to TNT-based compositions, have no effect on the growth process. Finally the presence of anthracene and 11-nitronaphthalene, additives recommended to reduce exudation and/or cracking in commercial TNT charges, increases growth in polycrystalline TNT. These results are fully in accord with the mechanism proposed previously to account for the growth process.

514,692
DE85000161/GAR PC **A07/MF A01**
Oak Ridge National Lab., TN.
Spark Decomposition of SF sub 6 ; Toxicity of by-Products.
I. Sauers, H. W. Ellis, L. G. Christophorou, G. D. Griffin, and C. E. Easterly. Oct 84, 137p ORNL/TM-9062
Contract AC05-84OR21400
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We have detected and mass identified ionic and neutral species produced in spark discharges in SF sub 6 gas. The first direct identification was made of ions originating in sparks in gases in the pressure range 10-100 kPa. We report on ionic species present in highly purified SF sub 6 and also in regular dielectric grade gas. The ionic species produced in the spark discharge appear to be strongly dependent on the inpurities in the gas. Many of the stable neutral by-products which we identified in sparked SF sub 6 have been previously observed in SF sub 6 under a variety of discharge conditions. An attempt was made to trace the chemical evolution of neutral by-products from those primary species produced upon the collapse of the spark to the final long-lived species. A technique was developed for detecting small amounts of SF sub 4 in a large background of SF sub 6 . An estimate was obtained for the rate of formation of SF sub 4 in sparked SF sub 6 in the spark chamber. It was established that many of the more abundant long-lived by-products are formed in a chemical reaction scheme based on SF sub 4 as the primary by-product and in which H sub 2 O plays a key role. Concentrations of many of the more abundant long-lived by-products were measured. While unsparked SF sub 6 is nontoxic, the sparked gas is cytotoxic to mammalian cells. Furthermore, the degree of cytotoxicity increases with the total energy dissipated in the sparked gas. We have tested many of the more abundant identified spark by-products for cytotoxicity toward the same cell line under identical, controlled conditions. Although many of the identified by-products are toxic, we have not yet been able to account for the overall high degree of cytotoxicity exhibited by sparked SF sub 6 . (ERA citation 10:000990)

514,693
DE85000585/GAR PC A02/MF A01
Argonne National Lab., IL.
Resonantly Enhanced Multiphoton Ionization of Molecules.
J. L. Dehmer, P. M. Dehmer, and S. T. Pratt. 1984, 3p CONF-8410160-1
Contract W-31-109-ENG-38
DOE workshop on advanced laser technology for chemical measurements, Upton, NY, USA, 23 Oct 1984.

During the past two years, attention was focused on single-color and multicolor multiphoton processes in diatomic molecules (H sub 2 , N sub 2). Products of photodissociation reactions were also studied. (ERA citation 10:001006)

514,694
DE85000624/GAR PC A03/MF A01
California Univ., Berkeley. Lawrence Berkeley Lab.
Molecular Dynamics Study of the Reaction: H Sub 2 + OH Yields H sub 2 O + H.
O. Rashed, and N. J. Brown. Oct 84, 44p LBL-18531, CONF-8410156-1
Contract AC03-76SF00098
Fall meeting of the Western States Section of the Combustion Institute, Stanford, CA, USA, 22 Oct 1984.
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Classical trajectory calculations have been performed to determine the influence of translational temperature, H sub 2 vibrational energy, H sub 2 rotational energy, OH vibrational energy, and OH rotational energy on the reaction, H sub 2 + OH yields H sub 2 O + H. The potential energy surface was a modification of the Schatz-Elgersma analytical fit to the Walsh-Dunning surface. Reactivity increases with translational temperature, and is most strongly influenced by it. Rotational excitation of either or both molecules suppresses reactivity. Vibrational excitation of H sub 2 enhances reactivity, and vibrational excitation of OH has no effect. A thermal rate coefficient was computed for the reaction at 1200 and 2000 K. The computed value compares favorably with the experiment at 2000 K, while the agreement at 1200 K is less satisfactory. The agreement between theory and experiment at both temperatures indicates that the potential surface is a reasonable representation of the HHOH potential energy surface. (ERA citation 10:002928)

514,695
DE85000807/GAR PC A02/MF A01
Brigham Young Univ., Provo, UT.
Separation of Selected Cations by Liquid Membranes. Progress Report, 1 December 1983-31 August 1984.
J. J. Christensen. 26 Sep 84, 13p DOE/ER/05016-6
Contract AC02-78ER05016
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Objective is to elucidate the chemical principles responsible for the cation selectivity and permeability of liquid membranes containing macrocyclic carriers. During the past year, the research program has focused on three specific areas: investigation of cation transport in lipid vesicles as models of liquid surfactant (emulsion) membrane transport, transport of metal cations by calixarene carriers, and final preparation of a manuscript describing selective cation transport from ternary mixtures. (ERA citation 10:000961)

514,696
DE85000857/GAR PC A02/MF A01
Physical Sciences, Inc., Andover, MA.
Experimental and Theoretical Study of Condensation in Multicomponent Vapors. Quarterly Report No. 1 for 15 February-14 May 1984.
G. Wilemski, and M. B. Frish. Jul 84, 25p DOE/ER/13154-T1
Contract AC02-84ER13154
Portions are illegible in microfiche products.

This report covers work performed during the first quarter of a multi-year program to study condensation in multi-component vapors. Design of the supersonic flow/laser light scattering experiment is discussed. Calculations of nucleation onset conditions were performed for the water-methanol and water-ethanol systems using our new revised classical theory of binary nucleation. The calculations agree well with experimental diffusion cloud chamber results and differ significantly from standard classical theory results at high water concentrations. (ERA citation 10:002857)

514,697
DE85001650/GAR PC A02/MF A01
California Univ., Berkeley. Lawrence Berkeley Lab.
Studies of the Kinetics and Mechanisms of Ammonia Synthesis and Hydrodesulfurization on Metal Single Crystal Surfaces.
A. J. Gellman, M. Asscher, and G. A. Somorjai. Jul 84, 14p LBL-18289, CONF-840805-24
Contract AC03-76SF00098
188. meeting of the American Chemical Society, Philadelphia, PA, USA, 26 Aug 1984.

We have studied the ammonia synthesis reaction over Fe and Re single crystal surfaces and the hydrodesulfurization of thiophene over the Mo(100) single crystal surface. The studies have been performed using uhv surface science tools with the capability of exposing the surfaces to high-pressure, high-temperature reaction conditions. The ammonia synthesis reaction was shown to be extremely sensitive to surface structure on both Fe and Re, favoring surfaces with a rough or open topography. The HDS reaction on the Mo(100) surface has been shown to be similar to that on MoS sub 2 and appears to proceed via a reaction path that does not produce a strong Mo-S bond as an intermediate species. (ERA citation 10:002860)

514,698
DE85002613/GAR PC A02/MF A01
Iowa State Univ., Ames. Dept. of Chemical Engineering.
Hydrodesulfurization by Reduced Molybdenum Sulfides: Activity and Selectivity of Chevrel Phase Catalysts.
K. F. McCarty, and G. L. Schrader. 1984, 10p IS-M-516, CONF-841121-9
Contract W-7405-ENG-82
AIChE annual meeting, San Francisco, CA, USA, 25 Nov 1984.

Much of current research on hydrodesulfurization catalysis has been performed using catalysts which are prepared starting with Mo exp +6 oxides supported on gamma -alumina. These Mo exp +6 oxides become reduced and sulfided under catalytic reaction conditions. Despite extensive research efforts, the catalytic role of the various molybdenum species is still unclear. This document reports results for a new group of reduced, ternary, molybdenum sulfide catalysts, referred to as Chevrel phases. The solid state chemistry of these catalysts may be carefully controlled to permit explicit relationships with catalytic activity to be established. (ERA citation 10:002858)

514,699
DE85002785/GAR PC A04/MF A01
Brookhaven National Lab., Upton, NY.
Separation of Helium-Methane Mixtures by Single-Column Pressure Swing Adsorption.
W. W. Merrill, P. A. Sackinger, and H. A. Valeiras. Sep 83, 60p BNL-51815, MIT/BNL-83-2
Contract AC02-76CH00016
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An experimental and theoretical study of helium-methane separations by pressure swing adsorption was conducted using a single-column, three step process with an activated carbon adsorbent. Experimental results showed that the column performance was affected by feed step time, operating pressures, and product flowrate. The product enrichment decreased with increasing feed time and product flowrate, and increased with increasing operating pressures. The resistance to mass transfer was investigated and was found to be negligible. An equilibrium model which included the effects of pressure gradients (spatial and temporal) in the column was developed, with the gas flow being described by Darcy's law. (ERA citation 10:002945)

514,700
DE85002968/GAR PC A02/MF A01
Illinois Univ. at Urbana-Champaign. School of Chemical Sciences.
Theta Pinch Discharges for Solids Vaporization and Elemental Chemical Analysis. Technical Progress Report.
1984, 4p DOE/ER/13218-2
Contract FG02-84ER13218

Progress in using a theta pinch discharge for sampling and excitation of solids for elemental analysis is reported. Spectral data were collected. The sample used to explore pinch behavior was Al alloy 2024; argon or helium was used as fill gas. The magnetic compress coil have been redesigned. Experiments have been conducted on the pinch light emission and the preionizer current. Primary goal remains the generation of a sufficiently hot, dense plasma to vaporize high-melting materials. (ERA citation 10:002824)

514,701
N85-13000/3/GAR PC A03/MF A01
Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt e.V., Hardthausen (Germany, F.R.).
Mathematical Models for the Boiling Diagram of the Ideal Two-Component Mixture.
W. Moellenbruck. May 84, 32p DFVLR-FB-84-22
In German; English Summary.

Dependencies of the boiling diagram (boiling curve and dewing curve) and the vapor pressure diagram are pointed out using Dalton's and Raoult's law. Both diagrams are used to draw concentration enthalpy diagrams of mixtures for an absorption pump for refrigeration or heating.

514,702
N85-13001/1/GAR PC A05/MF A01
Dornier-Werke G.m.b.H., Friedrichshafen (Germany, F.R.).
Development and Testing of Thin Film Cells for High Temperature Water Vapor Electrolysis.
Final Report, Sep. 1983.
G. Dietrich, H. Hermeking, A. Koch, W. J. C. Mueller, and W. Schaefer. Jul 84, 96p BMFT-FB-T-84-146
In German; English Summary. Sponsored by Bundesministerium fuer Forschung und Technologie.

High temperature electrolysis (HTE) cells using thin Z+O2/Y2 O3 solid state electrolytes were manufactured and tested under real electrolysis conditions. The electrolytes were prepared by the electrochemical vapor deposition (EVD) method. The EVD method gives a reproducible deposition of electrolytes, which satisfies composition, crystal structure, oxygen ion conductivity requirements and gas-tightness under operating conditions of HTE. Tubular cells manufactured by this technique allow a simple gas inlet system and easy electrical series connection of single cells. Electrolysis experiments show reduced ohmic losses in such cells. Thin film technique in HTE leads to increased current densities and decreased operating temperatures at the same losses.

514,703
N85-13002/9/GAR PC A04/MF A01
Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Inst. fuer Nukleare Sicherheitsforschung.
PRIAMUS: Ein Rechenprogramm zur Bestimmung Thermophysikalischer Stoffwerte von Gasmischungen Aus O2, N2, CO, CO7, He, H2O, H2 und CH4 (PRIAMUS, a Computer Program for the Calculation of Thermophysical Properties of Gas Mixtures Containing O2, N2, CO, CO2, He, H2O, H2, CH4).
R. Finken, and R. Moormann. May 84, 68p JUEL-1916
In German; English Summary.

The physical basis, the structure and the application of the computer code PRIAMUS (Properties of gas mixtures) are described. The PRIAMUS calculates the density, heat capacity, enthalpy, entropy and velocity of sound, viscosity, heat conductivity, diffusion coefficients, and Prandtl and Schmidt number of gas mixtures containing O2, N2, CO, CO2, He, H2O, H2 and CH4. The concepts of ideal gas and dilute gas are used. A Redlech-Kwong correction for real gases is selectable. The PRIAMUS is suitable for temperatures between 273 and 3000K and for pressures up to 100 bar.

514,704
N85-13003/7/GAR PC A02/MF A01
Imperial Coll. of Science and Technology, London (England).
Combustion Waves in Dispersed-2-Phase Mixtures.
D. B. Spalding. May 84, 20p CFD/84/13
Presented at Royal Inst. Fast Reactions in Energetic Mater. Meeting, 21-22 May 1984.

Combustion phenomena involving the dispersion of finely-divided fuel particles, suspended in a gas are discussed. The rate of chemical reaction often depends upon the relative velocity of the two phases,

and this velocity depends on the presence of pressure waves which may be a consequence of the chemical reaction. Combustion phenomena in furnaces, diesel engines, rocket motors and guns all exhibit these interactions. Even when only a single (gaseous) phase is present, reactant and product often behave in a two phase manner, fragments of the one being mingled with the other. Numerical computation of unsteady-combustion wave phenomena arising when the exothermic chemical reaction takes place within a confined space is illustrated.

514,705

N85-13009/4/GAR PC **A03/MF A01**
National Aeronautics and Space Administration, Washington, DC.
Alpha-Form of the Hydroxides of Bivalent Metals.
W. Feitknecht. Aug 84, 27p NAS 1.15:77508, NASA-TM-77508
Contract NASW-3542
Transl. into English from Helv. Chim. Acta (Switzerland), V. 21, 1983 p 766-784. Transl. by Scientific Translation Service, Santa Barbara, CA.

X-ray analyses were made of the hydroxides of the bivalent metals. The freshly pptd. hydroxide is usually in the alpha-form, which on standing is converted to another form or other forms. The alpha and c grating dimensions of the alpha-form and the C6-type of Co, Zn, C, Co-Zn and Ni-Zn hydroxides are tabulated. Ni hydroxide does not exhibit an alpha-form. The alpha-Co(OH)2, the blue form, is stabilized by sugar or by the higher alcohols: these compounds do not stabilize alpha-Zn(OH)2.

514,706

N85-13558/0/GAR PC **A02/MF A01**
Louisiana State Univ., Baton Rouge.
Oscillator Strengths for OII Ions.
Progress Report.
Y. K. Ho, and J. W. Henry. Apr 83, 17p NAS 1.26:174153, NASA-CR-174153
Contract NAGW-48

Oscillator strengths between various doublet states of OII ions are calculated in which extensive multi-configuration wave functions are used. The lower levels for the transitions are of the 2p(3) D(2)o and 2p(3) 2po states, and the upper levels are 2p(4), 3s, and 3d states. The results, which are estimated to have errors of less than 10% for individual transitions, agree quite well with the beam foil experiments, as well as with the calculations by use of the non-closed shell many electron theory (NCMET). The agreement with the rocket measurements is also good except for the 538/581 A pair, in which the 538 A line is believed to be blend with the other stronger quartet line. However, a comparison with the recent branching ratio measurement indicates that discrepances between the present calculation and th experiment do exist for ertain transistions.

514,707

N85-13559/8/GAR PC **A02/MF A01**
Pennsylvania State Univ., University Park.
Velocity-Changing Collisional Effects in Nonlinear Atomic Spectroscopy and Photon Echo Decay in Gases.
R. M. Herman. 1983, 15p NAS 1.26:174159, NASA-CR-174159
Contract NAG5-303

A general theory of atomic dipole coherence under the influence of collisional phase changes, inelastic effects and optically active atom velocity changes, including those due to anisotropic interactions is presented. Velocity change effects are obtained in closed form. Line shapes appear as convolutions of standard pressure broadening contours with velocity-change contours. Width and shift parameters for the He-broadened Na D lines at 2 m bar pressure, 380 K are calculated, as are He-induced photon echo decay rates for these lines. Overall agreement with xperiment is reasonably good.

514,708

N85-13588/7/GAR PC **A06/MF A01**
Max-Planck-Inst. fuer Stroemungsforschung, Goettingen (Germany, F.R.).
Energieuebertraege bei Atom-Molekuel-Streuexperimenten AM Beispiel der Systeme SF6-AR, CF4-Ne und Xe-CO2 Im I 1 Ev-Bereich (Energy Transfer in Atom-Molecule Scattering Experiments in the 1EV Region with SF6-AR, CF4-Ne and Xe-CO2 Systems as Examples).
Thesis.
E. Piper. Nov 83, 119p REPT-11/1983
Text in German.

Energy transfer processes in SF6-Ar, CF4-Ne and Xe-CO2 in an energy region of 0.5 to 1eV were studied. A modified molecular beam apparatus permitted measurement of differential scattering cross sections and inelastic collisions over a large angular region. Analysis of inelastic collision processes using pseudostatistic time of flight theory is presented. For all three systems the energy transfer is a maximum in a definite angular region of a center of mass frame. Comparison with theory shows the energy transfer of SF6-Ar and CF4-Ne systems is due to rotation and vibration excitation whereas that of the Xe-CO2 system is due to rotation excitation.

514,709

N85-13589/5/GAR PC **A02/MF A01**
Max-Planck-Inst. fuer Stroemungsforschung, Goettingen (Germany, F.R.).
Untersuchung der K Wechselwirkung bei Stoesenergien Zwischen 0.5 und 5.7 Ev (Investigation on K (4 2P3/2) Hg Interaction at Collision Energies from 0.5 to 5.7 Ev).
Thesis.
J. Maier. Dec 83, 21p MPIS-15/1983
Text in German.

In an experiment with crossed molecular beams, the total differential scattering cross section was measured for the system K (4 2P3/2) - Hg, the collision energies ranging from 0.5 to 6.8 eV. The excited potassium atoms were prepared to hyperfine-state with a single-mode oxazine laser. Difference measurements (laser on and off) determined the total differential scattering cross section in the excited state. Using Lennard-Jones potentials, the experimental results can be reproduced by calculation. The average values for the equilibrium distance and the potential energy are given.

514,710

N85-13590/3/GAR PC **A10/MF A01**
Max-Planck-Inst. fuer Stroemungsforschung, Goettingen (Germany, F.R.).
Rotationsinelastic Streuung von He-Atoms an HF-, HCl-, CF4-, SF6-, C2H6- und C2F6-Molekuelen (Rotational Inelastic Scattering of He-Atoms at HF-, HCl-, CF4-, SF6-, C2H6- and C2F6-Molecules).
Thesis.
J. Frick. May 84, 219p MPIS-9/1984
Text in German.

The measurement of total differential scattering cross sections and energy loss spectra up to scattering angles of 80 deg for the collision systems He-HCl, -HF, -C2H6, -C2F6, -CF4, -SF6 and Ne-SF6 is described. The collision energies being 69 to 95 MeV, the only inelastic precess is the transfer of rotational energy. The measuring device contains two crossed molecular beams in a vetical-plane configuration and separates single rotational transfers of two-atomic molecules models. Scattering calculations for the two-atomic targets were performed, with the exact close-coupling method.

514,711

PB85-137289/GAR PC **E04/MF E04**
Ecole Nationale Superieure de Techniques Avancees, Paris (France). Lab. d Optique Appliquee.
Obturateur a Effet Kerr Optique. Rapport de Synthese Finale (Obturator with Optic Kerr Effect. Final Report),
J. Etchepare, and G. Grillon. 1984, 47p
Text in French. Sponsored by Centre de Documentation de l'Armement, Paris (France). Direction des Recherches, Etudes et Techniques.

The authors researched strongly active, non-linear media which present a high Kerr constant and a fast response. At present, only the beta carotene in solution in acetone responds to this objective and follows the command pulse layer, but its utilization is limited to the red spectrum range. They have shown that benzene constitutes a good obturator between 400 and 850 nm with a control beam of 620 nm; nevertheless, there remains a weak molecular component which limits its resolution. Additional research will be necessary in order to improve it; they shall direct their research to solids and solids in solution, the liquids presenting all the slow components greater than those found in the benzene. Parallely with this study, they have used an obturator which made it possible to confirm the practical conditions for its utilization in spectroscopy.

514,712

PB85-143204/GAR PC **E03/MF E01**
Bern Univ. (Switzerland). Inst. fuer Angewandte Physik.
Dynamic Stark-Effect in Thallium,
P. D. Henchoz, W. Luthy, and R. Schmiele. 21 Dec 82, 23p

New measurements of time-resolved and time-integrated spectra of the 535 nm laser-emission in photodissociated thalliumiodide are presented. The emission frequency difference between the two stable thallium isotopes leads to an splitting of the lines due to the dynamic Stark-effect. It is shown that at high intensities the Stark-splitting is reduced due to the reduction of the lifetime of the excited thallium atoms by stimulated emission.

514,713

PB85-143261/GAR PC **A07/MF A01**
Engineering-Science, Inc., Durham, NC.
Technical Assistance Document for Monitoring Sulfuric Acid Vapor from Stationary Sources,
W. T. Winberry. Jan 85, 150p EPA/600/4-85/005
Contract EPA-68-01-6312

When fuels containing sulfur are burned, almost quantitative formation of sulfur dioxide (SO_2) occurs. As much as 5-8% of the sulfur dioxide emitted may be converted to sulfur trioxide either by atomic oxygen in the combustion zone or by efficient catalysis of heavy metal contaminants in the fuel oil. At moisture levels above four percent and temperatures below 300F (149C), theoretical models indicate that the sulfur trioxide quickly combines with the water vapor present to form sulfuric acid vapor. The composition and concentration of the chemical species emitted are influenced by fuel characteristics, boiler design and operation, and emission controls. It is precisely this combination of emissions of different species of sulfates that has hindered the characterization and measurement of sulfuric acid vapor from combustion sources. This document describes the different types of monitoring principles with their advantages and limitations. Evaluation of different monitoring techniques--both laboratory and field evaluation--are included in the document. Also included is a section dealing with generating known concentration of sulfuric acid vapor used in evaluating monitoring techniques.

514,714

PB85-143766/GAR PC **A10/MF A01**
Life Systems, Inc., Cleveland, OH.
Analytical Reference Standards and Supplemental Data: The Pesticides and Industrial Chemicals Repository.
Oct 84, 216p EPA/600/4-84/082
Contract EPA-68-03-3136
Prepared in cooperation with Northrop Services, Inc., Research Triangle Park, NC.

This edition of the Analytical Reference Standards and Supplemental Data: The Pesticides and Industrial Chemicals Repository (hereinafter referred to as the 'Index'), supercedes the previous edition (EPA-600/2-81-011) published in January, 1981. Continuing with the general format begun in the 1973 edition, the Index has been divided into separate listings for the pesticidal compounds and the industrial chemicals, along with a number of supporting sections. Section 1 provides a history of the Pesticides and Industrial Chemicals Repository, its purpose and related Program services. Section 2 contains guidelines for requesting standards and information on technical assistance and emergencies, shipping restrictions and shipment acknowledgment. Section 3 lists the pesticide reference standards currently available from the Repository. These standards are listed according to Compound Code Number. An alphabetical cross-reference by common name is also provided. This section lists additions to and deletions from the previous edition of the Index, as well as compound name changes since 1981. Section 4 contains the industrial chemical reference standards currently available from the Repository, additions to and deletions from the previous edi-

tion of the Index and compound name changes since 1981. Section 5 addresses the proper handling of primary standards. Guidelines for preparation and storage of standard solutions are presented in Section 6 and a listing of contributing chemical manufacturers is contained in Section 7. A Mailing List Confirmation Form is supplied in Section 8. This form must be completed, signed and returned to the Repository to retain your organization on the Repository's permanent mailing list.

514,715
PB85-144368/GAR PC **A04**/MF **A01**
Sonoma Technology, Inc., Santa Rosa, CA.
Theoretical Study of the Optical Properties of Diesel Particles.
Final rept.,
L. W. Richards. Aug 84, 62p STI-90112-401-2FR, CRC-APRAC-CAPA-13-76-04

The particles emitted by diesel engines are largely elemental carbon and have a morphology similar to carbon black. Therefore, the optical properties of diesel particles should resemble those of carbon black. This report describes prior work in which the light-absorbing properties of various grades of carbon black were successfully related to the average aggregate (particle) size. Work was done under this contract to see if existing data for light-scattering by suspensions of carbon black could be similarly related to the aggregate morphology, but satisfactory generalizations could not be obtained. The effects of fine-particle carbon on the optical properties of urban hazes in the visible wavelength range were explored to determine the dominant effects and to see if simple parameters (such as visual range in green) provide an adequate measure of these effects. It is known that fine-particle carbon absorbs more strongly in the blue than in the red, so that when it is mixed with a white pigment, the resulting gray can appear somewhat brown. The possibility of a similar effect in urban hazes was investigated, but found not to occur.

514,716
PB85-149698/GAR PC **A05**/MF **A01**
General Electric Corporate Research and Development, Schenectady, NY.
Kinetics of Nitric Oxide Formation in Laminar and Turbulent Methane Combustion.
Annual rept. Sep 83-Sep 84,
M. C. Drake. Sep 84, 86p R-84-SRD-050, GRI-84/0204
Contract GRI-5081-263-0600
See also PB84-198464.

Many practical combustor devices operate as turbulent diffusion flames, and the control of their NOx emissions remains a technologically and environmentally important problem. Understanding both chemical and turbulent fluid mixing processes is essential for quantitative prediction of NOx emissions. This report summarizes laser diagnostic (pulsed Raman, laser velocimetry, and saturated fluorescence) and probe sampling measurements on laminar opposed-flow diffusion flames and turbulent jet diffusion flames. In laminar opposed flow diffusion flames of CO/H2/N2 fuel in air, measured flame temperatures are 200 K lower than equilibrium, indicating substantial superequilibrium effects similar to those in turbulent CO/H2/N2 jet diffusion flames observed last year under this contract. Measurements in laminar opposed flow CH4 flames show even more pronounced temperature decrements from equilibrium (especially at high strain rates). Measurements in turbulent CO/H2/N2 jet diffusion flames downstream of the flamefront demonstrate that NO formed in the flamefront is slowly converted to NO2 in the post flame region. The measured NO2/NO ratio is proportional to (OH)(sup 2) which is consistent with NO + HO2 yields NO2 + OH, as the predominate NO2 forming reaction.

514,717
PB85-151330/GAR PC **A03**/MF **A01**
Ohio State Univ. Research Foundation, Columbus.
Limitations on the Efficiency of the Solar Photoreduction of Carbon.
Annual rept. Jun 83-May 84,
R. T. Ross. Nov 84, 42p GRI-84/0200
Contract GRI-5082-260-0642

The ultimate cost-effectiveness of the solar photoreduction of carbon to produce gaseous fuels will depend significantly on the thermodynamic efficiency of the conversion process. The purpose of this project is to clarify the thermodynamic and kinetic limits on the efficiency of solar photochemistry in general, and the solar photoreduction of carbon in particular. Current effort is focused on general limits on photoconversion efficiency and on the sources of inefficiency in photosynthesis. A non-mathematical proof was devised for the generality of the Carnot limitation on light-energy conversion efficiency. Losses due to the finite width of electronic spectral bands were found to cause a significant loss in achievable conversion efficiency when typical aromatic molecules are used for light absorption. The matrix algebraic technique of factor analysis was generalized to make it applicable to multidimensional data arrays; because fluorescence intensity can vary with excitation wavelength, emission wavelength, time since excitation, and the relative concentration of fluorophores, this new tool is particularly suited for analysis of the fluorescence of complex mixtures such as the light-absorbing pigments of photosynthesis. Conventional and multidimensional factor analysis were applied to the picosecond decay kinetics of fluorescence from photosynthetic pigments, with the resolution of three spectrally and kinetically distinct components.

514,718
PB85-151587 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Characterization of Surfaces Using Electron and Photon Stimulated Desorption.
Final rept.,
T. E. Madey, D. E. Ramaker, and R. Stockbauer. 1984, 26p
Pub. in Annual Review of Physical Chemistry 35, p215-240 1984.

The authors review various mechanisms of electron and photon stimulated desorption of ions and neutrals from surfaces. Examples include desorption from ionic surfaces, from covalent adsorbates on metal surfaces, and from layers of physically adsorbed atoms. The use of the electron stimulated desorption ion angular distribution (ESDIAD) method for determining local structures of surface molecules is described.

514,719
PB85-151603 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Vibrational Excitation, Harpooning, and Sticking in Molecule-Surface Collisions.
Final rept.,
J. W. Gadzuk, and J. K. Noerskov. 15 Sep 84, 11p
Pub. in Jnl. of Chemical Physics 81, n6 p2828-2838, 15 Sep 84.

The problem of vibrational excitation of a diatomic molecule scattering from a metal surface is considered for encounters in which the molecular electron affinity level crosses the surface Fermi level, thus allowing for electron transfer back and forth between metal and molecule during the scattering process. The problem is formulated within a diabatic representation in terms of a Landau-Zener-Tully-Preston curve hopping at the location where charge transfer or harpooning occurs, following related theory for other surface charge transfer processes. Account is taken of both the time dependence of the affinity level position and width due to the translational motion of the molecule. Vibrational excitation probability distributions for scattered molecules are calculated. Under certain circumstances, these are obtained in analytic form using a semi-classical wave packet dynamics model. A novel mechanism in which the energy redistribution from translational to internal vibrational modes gives rise to sticking of the undissociated molecule on the surface is presented.

514,720
PB85-151702 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Electrostriction and Dielectric Friction on Ions Moving through Compressible Polar Solvents.
Final rept.,
P. J. Stiles, and J. B. Hubbard. 6 Apr 84, 4p
Pub. in Chemical Physics Letters 105, n6 p655-658, 6 Apr 84.

The Hubbard-Onsager electrohydrodynamic model is extended to examine the influence of electrostriction on the mobilities of large ions in compressible polar solvents. The authors find that electrostriction leads to significant augmentation of the drag coefficients of large ions in aprotic solvents such as acetonitrile and acetone.

514,721
PB85-151744 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Application of the Extended Corresponding States Model to Hydrocarbon Mixtures (Computer Program EXCST).
Final rept.,
J. F. Ely. 1984, 14p
Sponsored by National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Pub. in Proceedings of Gas Processors Association Annual Convention (63rd), New Orleans, LA., March 19-21, 1984, p9-22.

The past few years have seen a resurgence of interest in accurate modelling of thermophysical properties of fluids. This interest can be attributed to both emerging new technological demands and to economic factors such as rising energy costs and needs for more accurate custody transfer models. In this report results obtained from a study designed to develop an accurate predictive model for the thermodynamic properties of hydrocarbon mixtures are presented. The model is called the extended corresponding states model and incorporates a mixture one-fluid concept originally due to van der Waals. In order to test the accuracy of the model, extensive comparisons between predicted and experimental densities, viscosities and thermal conductivities are presented. In addition, work is currently in progress to document phase equilibria and enthalpy prediction accuracy.

514,722
PB85-151777 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Thermodynamic Properties of Ethylene at Saturation.
Final rept.,
M. Jahangiri, R. T. Jacobsen, R. B. Stewart, and R. D. McCarty. 1984, 8p
Pub. in Advances in Cryogenic Engineering 29, p965-972 1984.

A new analysis of the liquid-vapor coexistence PVT of ethylene is presented. Mathematical models of the vapor pressure, saturated liquid and vapor densities are presented. Deviations between calculated and experimental data are given.

514,723
PB85-151785 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Semi-Automated Facilities for Measuring Density, PVT and VLE of Energy-Related Fluids.
Final rept.,
J. V. Sengers, and J. M. H. Levelt Sengers. 1984, 11p
Pub. in Proceedings of Symposium on Energy Engineering Sciences, Research on Instrumentation, Testing and Evaluation (2nd), Argonne, IL., April 10-11, 1984, p17-27.

To characterize the behavior of the thermodynamic properties of systems near a critical point systems are grouped into universality classes. Systems within a universality class have the same universal critical exponents and scaling functions. Specifically, fluids are expected to belong to the universality class of 3-dimensional Ising-like systems for which the universal quantities have been calculated with considerable accuracy. A scaled fundamental equation is presented which incorporates these theoretical predictions. Results obtained for various technologically important fluids, namely ordinary steam, heavy steam, ethylene and isobutane, are discussed.

514,724
PB85-151793 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Universal Representation of the Thermodynamic Properties of Fluids in the Critical Region.
Final rept.,
J. V. Sengers, and J. M. H. Levelt Sengers. Feb 84, 14p
Pub. in Int. J. Thermophys. 5, n2 p195-208 Feb 84.

To characterize the behavior of the thermodynamic properties of systems near a critical point systems are grouped into universality classes. Systems within a universality class have the same universal critical exponents and scaling functions. Specifically, fluids are expected to belong to the universality class of 3-dimensional Ising-like systems for which the universal quantities have been calculated with considerable accuracy. A scaled fundamental equation is presented which incorporates these theoretical predictions. Results ob-

tained for various technologically important fluids, namely ordinary steam, heavy steam, ethylene and isobutane, are discussed.

514,725
PB85-154581/GAR PC **A09/MF A01**
National Bureau of Standards (NEL), Gaithersburg, MD. Thermophysics Div.
Thermodynamic Properties of Isobutane-Isopentane Mixtures from 240 to 600K and up to 20 MPa (with Supplemental Tables from -40 to +600F and up to 1000 psia).
Interim rept.,
J. S. Gallagher, J. M. H. Levelt Sengers, G. Morrison, and J. V. Sengers. Nov 84, 183p NBSIR-84/2971
See also DE84-015137. Sponsored by Department of Energy, Oakland, CA. San Francisco Operations Office.

The Helmholtz function for pure isobutane from a recent correlation has been converted to a dimensionless form and a pressure-enthalpy chart based on this function has been generated by computer. A Helmholtz function for mixtures of isobutane and isopentane has been formed based upon the dimensionless isobutane Helmholtz function as the reference fluid by means of an extended corresponding-states principle. Scarce literature data for saturation properties of isopentane, and new data for its vapor pressure and for the critical line of the mixture were used. The accuracy of the surface was checked by comparing with literature enthalpy data and with new VLE data for the mixture. Tables of thermodynamic properties have been generated from this Helmholtz function for the 0.1 mole fraction isopentane-in-isobutane mixture in the single-phase region and on the dew- and bubble-point curves, together with properties of the coexisting phase. A pressure-enthalpy chart for this mixture has also been generated.

514,726
PB85-155976/GAR PC **A03/MF A01**
Brookhaven National Lab., Upton, NY.
Fuel Cell Reaction in Super Acid Electrolytes.
Final rept. Jun 83-Jun 84,
W. E. O'Grady. Oct 84, 27p GRI-84/0203
Contract GRI-5081-260-0584
See also PB84-160969.

The series of acids including HN(SO2 CF3)2 (CF2)4(SO3H)2, n-C4F9SO3H and CH3PO(OH)2 have been examined as possible fuel cell electrolytes. The reduction of oxygen in HN(SO2CF3)2 and (CF2)4(SO3H)2 is similar to that achieved in 4M KOH. The activity for oxygen reduction in the n-C4F9SO3H does not appear to be as high as found for other sulfonic acids studied. At this time, it is not clear whether or not this behavior is attributable to impurity effects. It appears that the superfluorosulfonic acids which contain CF3 groups tend to wet Teflon. In CH3PO(OH)2 oxygen reduction was similar to that in phosphoric acid; however, the data were not reproducible, probably due to the water content of the acid.

514,727
PB85-854768/GAR PC **N01/MF N01**
National Technical Information Service, Springfield, VA.
X Ray Fluorescence Analysis. July 1980-February 1985 (Citations from the NTIS Data Base).
Rept. for Jul 80-Feb 85.
Feb 85, 197p
Supersedes PB83-803617.

This bibliography contains citations concerning techniques, methodology, apparatus, design aspects, and applications of x-ray fluorescence analysis. References to the theory, excitation, sources, and detectors are included. Applications include utilization in the areas of industrial waste, air pollution, petroleum, and geochemistry. (This updated bibliography contains 209 citations, 83 of which are new entries to the previous edition.)

7E. Radio and Radiation Chemistry

514,728
DE85002635/GAR PC **A03/MF A01**
Notre Dame Univ., IN. Radiation Lab.
Radiation Laboratory (University of Notre Dame) Quarterly Report, April 1, 1984-June 30, 1984.
22 Oct 84, 48p DOE/ER/00038-2612, NDRL-2612
Contract AC02-76ER00038
Portions are illegible in microfiche products.

Seventy abstracts are presented of work in the following areas: radicals, photochemical reactions, photolysis, radiolysis, radiation chemistry, electron ranges, quenching, electron transfer, etc. (ERA citation 10:002916)

514,729
DE85002638/GAR PC **A03/MF A01**
Notre Dame Univ., IN. Radiation Lab.
Thermal Effects in Radiation Processing.
Z. P. Zagorski. 21 Oct 84, 44p CONF-8410183-1
Contract AC02-76ER00038
International meeting on radiation processing, San Diego, CA, USA, 21 Oct 1984.

The balance of ionizing radiation energy incident on an object being processed is discussed in terms of energy losses, influencing the amount really absorbed. To obtain the amount of heat produced, the absorbed energy is corrected for the change in internal energy of the system and for the heat effect of secondary reactions developing after the initiation. The temperature of a processed object results from the heat evolved and from the specific heat of the material comprising the object. The specific heat of most materials is usually much lower than that of aqueous systems and therefore temperatures after irradiation are higher. The role of low specific heat in radiation processing at cryogenic conditions is stressed. Adiabatic conditions of accelerator irradiation are contrasted with the steady state thermal conditions prevailing in large gamma sources. Among specific questions discussed in the last part of the paper are: intermediate and final temperature of composite materials, measurement of real thermal effects in situ, neutralization of undesired warming experienced during radiation processing, processing at temperatures other than ambient and administration of very high doses of radiation. (ERA citation 10:002023)

514,730
PB85-149706/GAR PC **A07/MF A01**
Eltron Research, Inc., Aurora, IL.
Solar-Assisted Hydrogen Generation by Photoelectrocatalysis.
Annual rept. 1 Oct 83-30 Sep 84,
A. F. Sammells, B. W. Wessels, P. M. Raccah, R. L. Cook, and P. G. P. Ang. Dec 84, 144p GRI-84/0222
Contract GRI-5083-260-0881
See also PB83-211904. Prepared in cooperation with Northwestern Univ., Evanston, IL., and Illinois Univ. at Chicago Circle.

This research effort is directed towards gaining basic insight into those factors which will help to improve the efficiency of hydrogen generation in photoelectrochemical cells. Emphasis of the program is on photoelectrode surface modification as an approach to improve such efficiencies. Both electrooptical and photoelectrochemical techniques are being used to characterize photoelectrode surfaces and includes photocapacitance spectroscopy and automatic scanning ellipsometry techniques. For surface modified p-InP the dependency of exchange current density as measured before and after the inception of hydrogen evolution has been examined as a function of incident light intensity. This was performed using the surface modifications Co/Pt, Ru/Pt, Rh/Pt, Ru, Pt, Rh and Co. Experimental results indicated that a progressively lower applied cathodic bias is required for hydrogen evolution in the order Ru/Pt < Rh/Pt < Co/Pt < Rh < Pt < Co < Ru < unmodified. Photoelectrode kinetics on alpha-Fe2O3 based photoanodes can be enhanced by the incorporation of platinum within the thermally grown oxide. A model is evolving which invokes the role surface states play in this order and in determining the shape of the experimental io vs incident light flux curves. The overall solar efficiency, as power savings for photoelectrochemical cells using a p-InP photocathode surface modified by sequential deposited Co and Pt and a platinum counter electrode, have been increased to 16% in alkaline electrolytes by depolarization of the counter electrode with monosaccharides.

8. EARTH SCIENCES AND OCEANOGRAPHY

8A. Biological Oceanography

514,731
AD-A148 918/6/GAR PC **A02/MF A01**
Florida State Univ., Tallahassee. Dept. of Oceanography.
Experimental Investigation of Enhanced Harpacticoid (Copepoda) Abundances Around Isolated Seagrass Shoots,
D. Thistle, J. A. Reidenauer, R. H. Findlay, and R. Waldo. 1984, 7p Rept no. 231
Contract N00014-82-C-0404
Pub. in Oecologia, v63 p295-299 1984.

No abstract available.

514,732
NUREG/CR-4070-V1/GAR PC **A07/MF A01**
Battelle Pacific Northwest Labs., Richland, WA.
Bivalve Fouling of Nuclear Power Plant Service-Water Systems. Volume 1. Correlation of Bivalve Biological Characteristics and Raw-Water System Design,
D. A. Neitzel, K. I. Johnson, T. L. Page, J. S. Young, and P. M. Daling. Dec 84, 136p PNL-5300-VOL-1

Fouling of raw-water systems in nuclear power plants in the United States can affect the safe operation of a power plant. This report describes correlations between the biology of bivalve organisms and the design and operation of power plants that allow bivalves to enter and reside in nuclear power plants. Discussions are focused on safety-related raw-water systems subject to fouling by the Asiatic clam (Corbicula fluminea), the blue mussel (Mytilus edulis), and the American oyster (Crassostrea virginica). Score sheets to rate fouling potential of power plant systems and components are provided.

514,733
N85-13447/6/GAR PC **A05/MF A01**
Jet Propulsion Lab., Pasadena, CA.
Coastal Zone Color Scanner (CZCS): Imagery of Near-Surface Phytoplankton Pigment Concentrations from the First Coastal Ocean Dynamics Experiment (CODE-1), March - July 1981.
M. R. Abbott, and P. M. Zion. 1 Aug 84, 81p NAS 1.26:174169, JPL-PUB-84-42, NASA-CR-174169
Contract NAS7-918

As part of the first Coastal Ocean Dynamics Experiment, images of ocean color were collected from late March until late July, 1981, by the Coastal Zone Color Scanner aboard Nimbus-7. Images that had sufficient cloud-free area to be of interest were processed to yield near-surface phytoplankton pigment concentrations. These images were then remapped to a fixed equal-area grid. This report contains photographs of the digital images and a brief description of the processing methods.

514,734
PB85-148831/GAR PC **A03/MF A01**
National Marine Fisheries Service, Honolulu, HI. Honolulu Lab.
Hawaiian Monk Seal Population Research, Lisianski Island, 1982.
Technical memo.,
H. S. Stone. Aug 84, 41p NOAA-TM-NMFS-SWFC-47

The absolute number of animals in the Hawaiian monk seal, Monachus schauinslandi, population at Lisianski Island was determined by identifying individuals on the basis of applied bleach symbols and natural marks,

and conducting 98 island censuses from 17 March to 14 September, and 26 October to 22 November 1982. The extensive data base obtained by these marking and census methods should provide specific quantitative information that may be useful in the interpretation of future census and population data from islands used by Hawaiian monk seals. The alternate day censuses provided data on temporal and spatial haul-out patterns for individual seals. Data were collected daily on pupping, weaning, molting, and other factors that may influence haul-out patterns. Injuries and deaths were documented.

8C. Dynamic Oceanography

514,735

AD-A148 876/6/GAR PC A02/MF A01
Woods Hole Oceanographic Institution, MA.
Tidal Phase Control of Sediment Discharge from the Yangtze River.
Technical rept.,
J. D. Milliman, Y. Hsueh, D. X. Hu, D. J. Pashinski, and H. T. Shen. 1984, 15p Rept no. WHOI-CONTRIB-5357
Contract N00014-81-C-0009
Pub. in Estuarine Coastal and Shelf Science, v19 p119-128 1984.

No abstract available.

514,736

AD-A148 927/7/GAR PC A02/MF A01
Woods Hole Oceanographic Institution, MA.
Finescale Velocity-Density Characteristics and Richardson Number Statistics of the Eastern Equatorial Pacific.
Technical rept.,
J. M. Toole, and S. P. Hayes. Apr 84, 18p Rept no. WHOI-CONTRIB-5462
Contract N00014-82-C-0019
Pub. in Jnl. of Physical Oceanography, v14 n4 p712-726 Apr 84.

No abstract available.

514,737

AD-A148 968/1 Not available NTIS
Woods Hole Oceanographic Institution, MA.
Dynamics of the Coupled Mixed Layer-Thermocline System and the Determination of the Oceanic Surface Density,
J. Pedlosky, W. Smith, and J. R. Luyten. Jul 84, 13p
Availability: Pub. in Jnl. of Physical Oceanography, v14 n7 p1159-1171 Jul 84 (No copies furnished by DTIC/NTIS).

No abstract available.

514,738

PB85-142719/GAR PC A08/MF A01
Massachusetts Inst. of Tech., Cambridge. Energy Lab.
TEA: A Linear Frequency Domain Finite Element Model for Tidal Embayment Analysis.
Final rept.,
J. J. Westerink, J. J. Connor, K. D. Stolzenbach, E. E. Adams, and A. M. Baptista. Feb 84, 151p MIT/EL-84/012
Sponsored by Northeast Utilities Service Co., Hartford, CT., New England Power Service Co., Westborough, MA., and National Oceanic and Atmospheric Administration, Washington, DC.

A frequency domain (harmonic) finite element model is developed for the numerical prediction of depth average circulation within small embayments. Such embayments are often characterized by irregular boundaries and bottom topography and large gradients in velocity. Previously developed finite element based time domain models require high eddy viscosity coefficients and small time steps to insure numerical stability, making application to small bays infeasible. Application of the harmonic method in conjunction with finite elements overcomes these problems. The model TEA, for Tidal Embayment Analysis, solves the linerized problem and is the core of a fully nonlinear code presently under development.

8E. Geodesy

514,739

N85-13365/0/GAR PC A02/MF A01
Johns Hopkins Univ., Baltimore, MD. Dept. of Earth and Planetary Sciences.
Lithospheric Structure in the Pacific Geoid.
Semiannual Report.
B. D. Marsh. 14 Dec 84, 5p NAS 1.26:174155, NASA-CR-174155
Contract NAG5-32

In order that sub-lithospheric density variations be revealed with the geoid, the regional geoid anomalies associated with bathymetric variations must first be removed. Spectral techniques were used to generate a synthetic geoid by filtering the residual bathymetry assuming an Airy-type isostatic compensation model. An unbiased estimated of the admittances show that for region under study, no single compensation mechanism will explain all of the power in the geoid. Nevertheless, because topographic features are mainly coherent with the geoid, to first order an isostationally compensated lithosphere cut by major E-W fracture zones accounts for most of the power in the high degree and other SEASAT geoid in the Pacific.

8G. Geology and Mineralogy

514,740

AD-A148 930/1/GAR PC A02/MF A01
Woods Hole Oceanographic Institution, MA.
Structure and Variability of Oceanic Crust on the Flanks of the East Pacific Rise between 11 and 13 N.
Technical rept.,
S. R. Bratt, and G. M. Purdy. 10 Jul 84, 17p Rept no. WHOI-CONTRIB-5550
Contracts N00014-82-C-0019, N00014-79-C-0071
Pub. in Jnl. of Geophysical Research, v89 nB7 p6111-6125, 10 Jul 84.

No abstract available.

514,741

AD-A148 945/9/GAR PC A08/MF A01
Army Engineer Waterways Experiment Station, Vicksburg, MS. Geotechnical Lab.
Selected Geologic Literature Lower Mississippi Valley Division Area Index and Annotated Bibliography. Supplement 6.
Technical rept.,
R. T. Saucier, and R. W. Hunt. Aug 84, 161p Rept no. WES/TR/GL-3-712-SUPPL-6
Supersedes Rept. no. WES/TR/GL-3-712-SUPPL-5 dated Dec 71.

Approximately 310 references to published and unpublished items of geologic literature have been evaluated and annotated since the publication of Supplement 5 in December 1971. The new references have been combined with those in the previous supplement and are presented in this supplement, which supersedes the previous supplements.

514,742

AD-A149 013/5/GAR PC A99/MF E03
Utah Univ. Research Inst., Salt Lake City. UBTL Div.
Hill AFB, Utah Installation Restoration Program. Phase IIB, IRP Survey. Volume 1. Text. Volume 2. Appendices.
Final rept.,
R. A. Belan, S. D. Lessley, and H. P. Ross. 11 Sep 84, 759p Rept no. TR-03-542-027-VOL-1/2
Contract F33615-80-D-4002

This report presents the results of the Phase II hydrogeologic survey at Hill Air Force Base (AFB), Utah which was accomplished under the U.S. Air Force Installation Restoration Program (IRP). The IRP Phase II Field Survey was conducted after the completion of an IRP Phase I Records Search by Engineering Science (1982). Thirteen disposal sites at Hill AFB were evaluated which were rated and prioritized by contamination potential. Of these sites, the U.S. Air Force selected the four highest priority waste disposal areas for initial Phase II investigation. The four waste areas selected were: (1) Chemical Disposal Pits No. 1 & 2, (2) Landfill No. 3, (3) Berman Pond, and (4) Chemical Disposal Pit No. 3. The report is presented in two volumes. Volume I is the text of the final report and Volume II contains supporting the investigation.

514,743

DE85000845/GAR PC A06/MF A01
Nevada Bureau of Mines and Geology, Reno.
Mineral Inventory of the Nevada Test Site, and Portions of Nellis Bombing and Gunnery Range Southern Nye County, Nevada. Final Report.
J. Quade, and J. V. Tingley. Sep 83, 111p DOE/NV/10295-1
Contract AS08-82NV10295
Portions are illegible in microfiche products. Original copy available until stock is exhausted.

The Nevada Test Site Mineral Inventory was completed in two stages. First, a search of the literature was made, and data on mineral occurrences within the project were compiled on short form Nevada CRIB forms. Mining activity in the area was plotted on maps for field use. Folios were then prepared for each mining district of area which included CRIB forms, geologic data, and pertinent references. This material was used for planning the field examinations. During the field phase of the project, every accessible mining district within the study area was examined. All important properties in each district as well as many outlying prospects were examined and described in order to provide more complete and accurate information beyond that provided in the literature. During the field examination, emphasis was placed on collecting geologic information on mineral occurrences and on noting past activity. In addition, samples showing typical mineralization were collected from most properties visited. All of the samples were high-graded from dumps, ore piles, outcrops, and from subsurface mine workings where access was possible. In some areas, samples of nearby intrusive rock or altered material were collected for comparison purposes. (ERA citation 10:001976)

514,744

NUREG/CR-4036/GAR PC A08/MF A01
Illinois State Geological Survey Div., Champaign.
Structural Geology of Southeastern Illinois and Vicinity.
Topical rept.,
W. J. Nelson, and D. K. Lumm. Nov 84, 159p
Contract NRC-04-81-016, Grant G1018

Southeastern Illinois is the locus of several converging fault systems of differing orientations. The specific research goals of this project were to determine the relationship of these fault systems (i.e. the Fluorospar District, the Wabash Valley, Shawneetown and the Cottage Grove) to each other and whether or not any of them have been active in the Quaternary. Detailed field mapping indicated that southern Illinois and adjacent areas are currently subject to a compressional stress field in which the major axis is east to east-northeast. North-trending thrust faults of small magnitude may be forming in response to these stresses, but the major fault systems are neither active or likely to be reactivated in this modern stress field.

514,745

N85-13359/3/GAR PC A04/MF A01
Instituto de Pesquisas Espaciais, Sao Paulo (Brazil).
Relatorio Do Trabalho de Campo Realizado NAS Bacias DOS Rios Quebra Osso E Tanque Preto, NA Quadricula de Catas Altas, Minas Gerais (Report of the Field Work Performed in the Basins of the Quebra Osso and Tanque Petro Rivers in the Catas Altas Quadrangle, Minas Gerais).
A. R. Dossantos, M. P. Barbosa, and P. Veneziani.
Sep 84, 58p INPE-3268-NTE/225
In Portuguese; English Summary.

The specific objective of this geological mapping in the region of Santa Barbara (MG) in the scale of 1:8,000, was to get acquainted with the lito-structural and tectonic evolution of the Quebra Osso and Nova Lima rocks part of the Greenstone Belt and its old basement.

514,746

N85-13406/2/GAR PC A02/MF A01
National Aeronautics and Space Administration, Greenbelt, MD. Goddard Space Flight Center.

Petrologic Model of the Northern Mississippi Embayment Based on Satellite Magnetic and Ground Based Geophysical Data.
H. H. Thomas. Jul 83, 16p NAS 1.15:85075, NASA-TM-85075
Submitted for Publication.

Magnetization, derived from gravity-seismic data from the northern Mississippi Embayment, is evaluated relative to magnetization values obtained from satellite magnetic data. A magnetization contrast of approximately -0.54 A/m determined from the geophysical model compares favorably to a value of approximately -0.47 A/m from MAGSAT United States Apparent Magnetization contrast map. The negative magnetization contrast, required by the MAGSAT data, is unusual as rift zones with the exception of those which are currently active are associated with positive magnetization. The model presented favors an intrusion of low Curie temperature mafic rock at the base of the crust. Alternate possibilities, a shallow Curie isotherm or remanence in a direction other than that of the current main field, seem less likely as reported regional heat flow values are too low and remanence is attenuated at depth.

514,747
N85-13407/0/GAR PC **A02/MF A01**
California Inst. of Tech., Pasadena.
Particle Velocity Experiments in Anorthosite and Gabbro.
M. B. Boslough, and T. J. Ahrens. 1984, 4p NAS 1.26:174158, CONTRIB-3949, NASA-CR-174158
Contract NGL-05-002-105

Shock wave experiments were conducted in San Gabriel anorthosite and San Marcos gabbra 10 11 GPa using a 40 mm-borne propellant gun. Particle velocities were measured directly at several points in each target by means of electromagnetic gauges. Hugoniot states were calculated by determining shock-transit time from the gauge records. Sound speeds indicate a loss of shear strength upon sock compression for both rocks, with the strength loss persisting upon release to zero stress on the anorthosite. Stress-density release paths in the anorthosite indicate possible transformation of albite to jadeite + (quartz or coesite), with the amount of material transformed increasing as a function of shock stress. Electrical interference effects in the gabbro precluded the determination of accurate release paths for the rock.

514,748
N85-13408/8/GAR PC **A02/MF A01**
State Univ. of New York at Albany.
Archean Sedimentation and Tectonics in Southern Africa.
Final Technical Report, 1 Aug. 1983 - 31 Mar. 1984.
W. S. F. Kidd. 1984, 4p NAS 1.26:174156, NASA-CR-174156
Contract NAGW-487

Sequences in the Barberton Mountain Land greenstone belt (southern Africa) were examined to determine the nature of the sedimentary rocks, their tectonic implications, and their bearing on the present large-scale structural condition of the belt. Also assessed was whether there was evidence for a significant component of shallow-water-deposited sedimentary rocks in the parent materials of the Limpopo belt. The nature of a largehigh strain zone on the southern margin of the central Limpopo belt was examined.

514,749
PB85-139202/GAR PC **A04/MF A01**
Alabama Univ., University. School of Mines and Energy Development.
Development of a Predictive Model for Porosity Distribution in the Smackover Formation of Southwest Alabama.
Research rept. (Final) 1983-84,
J. Benson. 15 Nov 84, 66p

This study is an attempt to identify porosity types in the Smackover of southwest Alabama; to determine the distribution of the various porosity types; to define the mechanisms responsible for porosity evolution; and to develop a model useful in predicting porosity distribution in the Smackover in southwest Alabama. This porosity would be a tremendous aid both to the exploration geologist seeking new reserves in southwest Alabama.

514,750
PB85-143675 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Mineralogical Characteristics of Asbestos.
Final rept.,
E. B. Steel, and A. G. Wylie. 1981, 7p
Sponsored by Society of Mining Engineers of AIME, Littleton, CO.
Pub. in Geology of Asbestos Deposits, p93-99 1981.

The asbestiform habit is most commonly developed in certain amphiboles and chrysotile, but other minerals may also crystallize with this unusual habit. The habit may be characterized by (1) a fibril structure, single or twinned crystals of very small widths (generally less than 0.5 micrometer) which have grown with a common fiber axis direction but which are disoriented in the other crystallographic directions, (2) anomalous optical properties, primarily parallel extinction, (3) unusual tensile strength, (4) high aspect ratio, and (5) flexibility. In addition, there is evidence to indicate that some amphibole asbestos may have unusual surface properties.

8H. Hydrology and Limnology

514,751
AD-A148 862/6/GAR PC **A16/MF A01**
Army Engineer District, New Orleans, LA.
Stages and Discharges of the Mississippi River and Tributaries and Other Watersheds in the New Orleans District for 1980.
Jan 84, 371p
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

Stages are readings of water surface elevations expressed in feet above the zero or reference point of the gage. The reference point is referred to either National Geodetic Vertical Datum of 1929 (NGVD) or mean low gulf datum. Mean low gulf is 0.78 foot below NGVD. National Geodetic Vertical Datum of 1929 is used in lieu of Sea Level Datum of 1929 (MSL). Discharge is the quantity of water flowing past a cross section of the stream in a unit of time. It is expressed in cubic feet per second. Discharge data consist of a brief description of the gaging station, results of discharge observations, and where determined, computed daily flows. Annual highest and lowest states are reported for most of the daily gage stations, In determining these extreme records, all available gage data, including continuous recorder charts, twice-daily gage readings, and gage records taken from discharge notes, inspection reports, etc., are used. The time of occurrence usually is reported for the annual highest stage but not for the annual lowest stage.

514,752
AD-A148 931/9/GAR PC **A02/MF A01**
Woods Hole Oceanographic Institution, MA.
Transfer of Particulate Organic Carbon and Nitrogen from the Yangtze River to the Ocean,
J. D. Milliman, Q. Xie, and Z. Yang. Sep 84, 11p
Rept no. WHOI-CONTRIB-5433
Contract N00014-81-C-0009
Pub. in American Jnl. of Science, v284 p824-834 Sep 84.

No abstract available.

514,753
PB85-138550/GAR PC **A07/MF A01**
Illinois State Water Survey Div., Champaign.
Public Groundwater Supplies in Will County,
D. M. Woller, and E. W. Sanderson. 1983, 131p ISWS/BULL-60(29)/83

This publication presents all available information on production wells used for public water supplies in Will County, Illinois. The definition of public water supply as contained in the Environmental Protection Act of 1970 was used to determine those water systems and wells to be included. Systems and wells described furnish water for drinking or general domestic use. This report includes separate descriptions for 70 public water supply systems furnishing water to 22 municipalities, 43 subdivisions, 3 state institutions, 2 state parks, and 1 university in Will County.

514,754
PB85-140515/GAR PC **E07/MF E07**
Institute of Hydrology, Wallingford (England).
Review of British Flood Forecasting Practice,
D. W. Reed. Aug 84, 119p R-90

The feasibility and success of a flood warning scheme depend on many factors, of which data acquisition and procedures for disseminating warnings are particularly important. Although the review examines these topics in some detail, the core of the material presented refers to the application of flood routing and rainfall/runoff models to flood forecasting. The continued use is recorded of simple correlation techniques for flood routing. The report describes the Muskingum family of flood routing methods and explains the particular merits of the variable parameter Muskingum-Cunge technique.

8I. Mining Engineering

514,755
AD-A148 988/9/GAR PC **A05/MF A01**
Army Engineer Waterways Experiment Station, Vicksburg, MS. Environmental Lab.
Military Hydrology. Report 6. Assessment of Two Currently 'Fieldable' Geophysical Methods for Military Ground-Water Detection.
Miscellaneous paper 1 May 82-30 Apr 83,
D. K. Butler, and J. L. Llopis. Oct 84, 86p Rept no. WES/MP/EL-79-6
See also AD-A109 590.

A Defense Science Board Water Support Task Force concluded that technology shortfalls exist in surface techniques for detection of ground water. These shortfalls in technology were also recognized in a Draft Letter of Agreement for a Subsurface Water Detector. Conclusions of a Geophysics Working Group at the Ground-Water Detection Workshop were: (a) there are two currently 'fieldable' geophysical methods, electrical resistivity and seismic refraction, that are applicable to the ground-water detection problem and may offer a near-term solution to the identified detection technology shortfall, and (b) there are several state-of-the-art and emerging geophysical techniques that may have potential in the far term for application to the ground-water detection problem. This report is the result of a study to (a) assess the feasibility of using two currently fieldable geophysical methods for military ground-water detection applications, (b) determine the limitations of the complementary use of the methods for detection application, and (c) determine the level of expertise required for acquiring, processing, and interpreting the geophysical data if the methodology is feasible and the limitations are acceptable. The report presents the results of geophysical surveys at two sites, White Sands Missile Range, N. Mex., and Fort Carson, Colo.

514,756
DE84017086/GAR PC **A02/MF A01**
Department of Energy, Pittsburgh, PA. Pittsburgh Energy Technology Center.
Wet Grinding Versus Dry Grinding for Deep Cleaning Ultrafine Coal by Flotation. Technical Progress Report.
K. J. Miller, and R. F. Guzzo. Sep 84, 15p DOE/PETC/TR-84/10

Laboratory froth flotation tests were conducted with dry- and wet-ground minus-400-mesh coal to determine the effect of grinding methods on clean coal recovery and product grade. A laboratory air-classifying impact mill was used for the dry grinding, and a stirred ball mill (attritor) was used for the wet grinding. Products of as near the same size distribution as possible were prepared by each method, i.e., nominal minus 27 micrometers (mu m) with a mean particle size of 10 to 12 mu m. The test results show that the dry-ground coal is more floatable (i.e., greater weight-percent recoveries were obtained at any given reagent dosage), but the wet-ground coal provides substantially lower ash products at equivalent yield. For example, the dry-ground coal yielded about 20 wt % to over 80 wt % froth product with frother reagent dosages of 0.1 to 0.5 pound per ton of dry solids (lb/ton), respectively, and the product ash contents ranged from 2.0 to 4.0%. The wet-ground coal, on the other hand, yielded about 25 wt % to a little over 70 wt % froth product with frother reagent dosages of 0.2 to 0.5 lb/ton, respectively, and the product ash contents ranged from about

1.5 to 2.0%. 4 figures, 2 tables. (ERA citation 10:001819)

514,757
DE84752107/GAR PC **A04**/MF **A01**
Bundesministerium fuer Forschung und Technologie, Bonn-Bad Godesberg (Germany, F.R.).
Technical Equipment for Rescuing Injured Miners in Case of Roof Breaks in Coal Faces and Roadways.
C. Zillessen. May 84, 68p BMFT-FB-HA-84-021
In German.
U.S. Sales Only. Portions are illegible in microfiche products.

The project goal was to develop a "rescueing system" allowing to faster rescue injured miners in case of roff breaks in coalfaces and roadways. Had also to be created the basis for mechanizing previously manual rescue activities. Appertaining literature in Germany and abroad, whilst describing rescue drilling operations, do not give any useful hints how to mechanize penetration into roof break areas in faces or roadways. Development work was thus centered on the following issues: - Efficient cutting through rock from roof breaks. - Protection of the rescueing squad from falling rock. - Reduction of foreign matter hampering heading operations. The newly developed rescueing system consists mainly of a cutting shield, integrated scrab-type loader, sraper conveyor, and discretionally extensible support tube. A crawler-mounted crab-type loader was to complete the rescueing equipment in special conditions. Whilst the different sub-elements passed the functional test successfully the integrates system did not prove useful during a simulated emergency. Unsolved procedural issues, numerous technical deficiencies and excessive mounting times helped to miss the project goal. Nonetheless different sub-elements, e.g. the support tube, may enhance the efficiency of conventional rescueing operations. (ERA citation 09:049439)

514,758
DE84901398/GAR PC **A02**/MF **A01**
Canada Centre for Mineral and Energy Technology, Ottawa (Ontario).
Canada Center for Mineral and Energy Technology: Open File Reports, List No. 17.
Jun 83, 11p NP-4901398
U.S. Sales Only. Portions are illegible in microfiche products.

Seventy-eight CANMET (Canada Center for Mineral and Energy Technology) publications are listed. (ERA citation 10:001679)

514,759
DE85000109/GAR PC **A05**/MF **A01**
Texas A and M Univ., College Station.
Enhanced Recovery of Oil from Subsurface Reservoirs with Carbon Dioxide. Final Report.
J. S. Osoba. Dec 84, 89p DOE/MC/10509-53
Contract AC21-79MC10509
Portions are illegible in microfiche products. Original copy available until stock is exhausted.

This report details the studies made of the displacement of crude oil by carbon dioxide (CO sub 2) from consolidated sandpacks. The sandpacks were 20, 60, and 240 inches long and the diameter was 5/8 inch. With the sandpack in a vertical position, the CO sub 2 was always injected into the top. The objectives of the research were to determine procedures for predicting the pressure at which CO sub 2 displaces crude miscibly and the influence of rate on the displacement of crude with CO sub 2 . The determination of the miscibility pressure appeared to be the same with the 20 inch long sandpack as with the 60 or 240 inch long sandpack. The total recovery at each pressure was higher with the longer sandpacks. The oil recovery was higher at low rates with the sandpack column in a vertical position. The oil recovery at low rates was lower with the sandpack column in a horizontal position. The optimum CO sub 2 slug size was found to be 30% of the hydrocarbon pore volume. Water was found to be more efficient than nitrogen at driving the CO sub 2 to displace crude oil. Measurements of the crude oil viscosity from the Foster field decreased as CO sub 2 miscibility pressure was increased. On the other hand, the viscosity of the SACROC crude oil from West Texas was found to have a minimum value at a CO sub 2 miscibility pressure of approximately 1600 psig. As the pressure increased, the viscosity of the oil with CO sub 2 increased. Values of the permeability of dolomite cores were found to increase when flooded with CO sub 2 at a high pressure. When the effluent from a core with CO sub 2 at a high pressure was flowed through a second dolomite core as the pressure was decreased, the permeability of the second core was decreased. Photographs showed that some of the dolomite core was dissolved by the CO sub 2 at high pressures, and that crystal precipitates were formed in the second core as the CO sub 2 miscibility pressure was reduced. 31 references, 37 figures, 19 tables. (ERA citation 10:000177)

514,760
DE85002153/GAR PC **A07**/MF **A01**
Aerospace Corp., El Segundo, CA. Energy and Resources Div.
Oil Field Data and Industry Opinions Important to the Commercialization of Solar Thermal Enhanced Oil Recovery.
E. J. Rattin, and P. K. Munjal. May 81, 134p ATR-81-(7977-01)-1
Contract AC03-81SF11515
Portions are illegible in microfiche products.

This evaluation report consolidates in a single volume a summary of the salient heavy crude field data as well as the industry opinion and attitude information concerning Solar Thermal Enhanced Oil Recovery (STEOR) which were collected by the five petroleum consultants and reported in six separate final reports. In addition, this report provides a critique of the accuracy and utility of the collected data, and highlights the data gaps which exist because requested data was unavailable or not collected. Although not the primary purpose of this report, the information made available by the data search does allow the reporting of some conclusions concerning the size of the potential STEOR market, the identification of the fields that are more likely STEOR prospects, and the feasibility of high solar fraction operation on the four California fields covered by the data search. The combined effort by the petroleum consultants was initially intended to be a precursor to a full-scale STEOR market study. The initial efforts were to support a DOE judgement concerning the advisability of such a market study and would provide such a study with an initial data base. These objectives have been fulfilled by the survey results by (a) indicating that the four oil fields covered by the data search are indeed a sizable STEOR market prospect, and by (b) providing a considerable data base, as well as by (c) highlighting areas for which added data requirements need to be addressed by any market study to follow. 14 references, 3 figures, 31 tables. (ERA citation 10:001846)

514,761
DE85002157/GAR PC **A02**/MF **A01**
Conoco, Inc., Casper, WY.
Multi-Pattern Low-Tension Demonstration Flood, Big Muddy Field. Technical Progress Report, July-September 1984.
T. R. Painter. 1984, 18p DOE/SF/01424-T5
Contract AC03-78SF01424
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The injection of the polymer-pusher slug continued through the third quarter of 1984. A short-term plant shutdown occurred in September due to a power failure; however, no problems resulted as operations continued smoothly. A total of 1,233,700 barrels of polymer-pusher slug has been injected through September 30, 1984, which is approximately 70% of the planned slug size. The average injection for September was 1142 BPD. Injection rates were cut another 15% on September 12 as further tests were conducted to define parting pressures. Oil production declined from 173 BOPD in June to 151 BOPD in September. Cumulative project production is 197,649 barrels of oil as of September 30, 1984. Sulfonate production was observed in all wells with Wells 91 and 88 showing the highest levels (1875 to 1250 ppM, respectively). The production-weighted average has dropped from 400 ppM in June to 280 ppM in September. The auxiliary treating facility for sulfonated oil was fully operational and continued to achieve merchantable oil. (ERA citation 10:001852)

514,762
DE85002164/GAR PC **A04**/MF **A01**
Aerospace Corp., El Segundo, CA. Energy and Resources Div.
Investment Evaluation of Solar Thermal Enhanced Oil Recovery (STEOR) Systems for Project Starts in the Years 1982 and 1986.
P. K. Munjal. May 81, 57p ATR-81(7977-01)-2
Contract AC03-81SF11515
Portions are illegible in microfiche products.

This report covers work performed to 30 April 1981 in the analyses of potential financing methods for solar thermal energy systems employed in the generation of steam for enhanced oil recovery. The analyses reported herein indicate the feasibility of attracting private financing for solar thermal energy steam generation systems for the enhanced oil recovery of heavy crudes as early as 1982 if government loan guarantees can be obtained. They also show that, if sufficient solar system production is stimulated by the use of such guarantee-backed private financing, anticipated system cost reductions will make government help unnecessary by 1985 to 1986. (ERA citation 10:000170)

514,763
DE85002165/GAR PC **A04**/MF **A01**
Aerospace Corp., El Segundo, CA. Energy and Resources Div.
Technical Support Services for the Solar Thermal Enhanced Oil Recovery Program. Volume 1. Program Summary Report, February 9-May 31, 1981.
E. J. Rattin. May 81, 53p ATR-81(7977-01)-3-V.1
Contract AC03-81SF11515
Portions are illegible in microfiche products.

The Aerospace Corporation between February 9 and May 31, 1981 concentrated on an evaluation of the results of the data search and the opinion survey, and on the analyses of several potential scenarios for financing solar thermal energy oil recovery (STEOR) system installations. The data search disclosed a large potential STEOR market, in the form of incremental steam demand for EOR, to exist on the four most promising heavy crude fields which were surveyed. About 80% of this market requires higher pressures and appears to mature rapidly, reaching peak levels between 1985 and 1987. The remaining 20% of market requires higher pressures and appears to mature considerably later. Although it is believed that the reported early peaking of the low pressure steam demand is probably due to lack of access to oil industry long-range planning, the current technical development status of line-focusing solar technology would allow a major penetration of this early market, given favorable economics. The analyses of scenarios for financing STEOR indicate, however, that government assistance, either in the form of direct subsidy, or by guaranteeing loans by private sources, would be necessary to create project economics favorable to early market penetration. Debt financing schemes (under condition of government loan guarantee) have been shown by these Aerospace analyses to be capable of offering rates of return in excess of 15% to the oil operators, even with project starts as early as 1982. Given the existence of such debt-financed projects during the 1982-1985 time period, and the realization of STEOR system cost reduction consequent to the equipment production rate increase caused by this early STEOR market, even equity-financed projects are believed to be viable in the post 1985 time period without government assistance of any type. 13 references, 4 figures, 2 tables. (ERA citation 10:000179)

514,764
DE85002180/GAR PC **A08**/MF **A01**
National Inst. for Petroleum and Energy Research, Bartlesville, OK.
Energy Production Research. Volume I. Quarterly Technical Report, April 1-June 30, 1984.
4 Sep 84, 173p NIPER-15-Vol.1
Contract FC01-83FE60149

Volume I of this third quarterly report briefly covers the progress of 21 research projects for the following areas: (1) interaction between reservoir rock and enhanced oil recovery (EOR) fluids; (2) reservoir screening and recovery predictions; (3) EOR environmental compatibility; (4) basic studies for EOR chemicals; (5) recovery process - gas displacement methods; (6) improvements in stimulation technology; (7) reservoir characterization for EOR application; (8) recovery processes - chemical; and (9) recovery processes - thermal. (ERA citation 10:001855)

514,765
DE85002322/GAR PC **A02**/MF **A01**
Foster-Miller Associates, Inc., Waltham, MA. Energy Systems Group.
York Canyon Mine Evaluation. Monthly Technical Progress Report No. 39, October 1-31, 1984.
S. K. Ruggieri. 19 Nov 84, 5p DOE/FE/00016-T63
Contract AI01-81FE00016
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The York Canyon mine evaluation has been completed and sent out for review and comment. Several mining companies including Consol, Plateau, and Emery have been contacted regarding future testing. York Canyon has also expressed interest in continuing the investigation. Further analysis of the York Canyon data has indicated several unknowns which should be identified during the next evaluation. Among them are the centrality of sensor position with respect to both cross and along the face axes. Also, it is felt that separation of other spatially related dust sources (e.g., conveyor, crusher, gob consolidation and air patterns) is important. In order to conduct the new headgate cutout tests, the existing longwall gallery was modified. A fan and duct work were added to simulate gob leakage in line with the headgate entry. Tracer gas concentration profiles, smoke tracers, and air velocity measurements have been taken. Primary airflows of 12,000 cfm with gob leakage of 5000 cfm and primary airflow of 7000 cfm without gob leakage gave similar results. The airflow along the face was the prime factor and not the primary airflow. The wing curtain did not have a significant impact on the tailgate operator and drum zones. It did have a marginal effect at the headgate operator zone. The use of shearer clearer spray system did have a large impact on improving the tracer gas pattern along the face, but at the same time adversely deteriorated the tailgate operator zone in two ways: higher tracer gas concentrations and water mist. (ERA citation 10:001807)

514,766

DE85003172/GAR PC **A04/MF A01**
Carnegie-Mellon Univ., Pittsburgh, PA. Dept. of Chemical Engineering.
Program of Basic Research on the Preparation and Stability of Coal/Water Slurries. Quarterly Report.
H. Atlas, E. Z. Casassa, G. D. Parfitt, and E. W. Toor. Nov 84, 71p DOE/PC/70765-2
Contract FG22-84PC70765
Portions are illegible in microfiche products. Original copy available until stock is exhausted.

The objective of this research is to relate the surface chemistry (surface charge, wettability and additive adsorption) of a coal to its previous history of oxidation and beneficiation, and to surface analysis of each coal sample. These studies will be used to further develop the model for coal/water slurry behavior which was proposed as a result of previous studies of coal/water slurry surface chemistry carried out between September 1981 and September 1983 under Grant No. DE-FG281PC40285 from DOE/PETC. These studies are expected to lead to a better understanding of the balance among and effects of the different types of materials on the heterogeneous coal surface which will allow more effective utilization of coal/water slurries, regardless of coal source. The report is organized according to specific tasks listed in the proposal Statement of Work. Research accomplishments and plans for the next report period are discussed for the following tasks: (1) standardizing of grinding conditions for coal No. 1; (2) characterization of pulverized coal at Carnegie-Mellon University; (3) chharacterization of pulverized coal at Gulf R. and D. Corp.; and (4) characterization of coal/water slurries prepared from aged coal. 4 references, 32 figures, 20 tables. (ERA citation 10:001818)

514,767

FE-2707-T1(V.2)/GAR PC **A06/MF A01**
Systems Consultants, Inc., Washington, DC.
Coal and Gas Pipeline Feasibility Study. Volume II. Technical and Economic Evaluation.
Oct 78, 122p
Contract EF-77-C-01-2707

No abstract available.

514,768

PB85-128064/GAR CP **T02**
Department of Energy, Washington, DC. Energy Information Administration.
Interstate Pipeline's Annual Report of Gas Supply, 1981-1983 (FERC-15).
Data file,
J. R. Arnold, and R. Marcotte. 1983, mag tape DOE/DF-85/001
Supersedes PB84-103407.
Source tape is in the EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products if you have questions.

The computer data tape specified herein contains three files consisting of FERC-15 respondent data for years 1981 thru 1983, respectively. Each file is identical in format and consists principally of reserves and production data reported in the Synopsis of Gas Supply, Schedule I, and Schedule II of the FERC-15. The Synopsis of Gas Supply and Schedule I contain summary level reserves and production data reflective of the detail information contained in Schedule II. The Synopsis of Gas Supply and Schedule I consist of a single page each. All volumes reported on these two forms are on a dry basis at a pressure base of 14.73 psia and 60 degrees Fahrenheit. Each unique source of supply is reported in Schedule II. The Schedule II format allows a maximum of five unique sources to be reported on each page, therefore, Schedule II submission may vary from one page too many. The data contained within each file are sorted ascendingly by company code, page number and line number.

514,769

PB85-156974/GAR PC **A10/MF A01**
Eaton Operating Co., Inc., Houston, TX.
Co-Production of Gas and Water, Third Year.
Final rept. Mar 82-Oct 84,
D. A. Langford, K. Peterson, and B. Parisi. Oct 84, 207p GRI-84/0213
Contract GRI-5081-212-0560
See also PB84-211457.

The objectives of this research effort were to locate, evaluate, acquire and test one or more co-production prospects. A prospect identification program was developed to locate prospective co-production reservoirs on the Texas Gulf Coast. The reservoirs identified were ranked according to their potential for enhanced gas recovery and are monitored and updated from industry activity on or near the prospects. Two of the highest ranking prospects were recommended for GRI participation after comprehensive geologic and engineering study. One of these prospects, N.E. Hitchcock, was approved as an alternative to the Port Arthur project and is currently in progress in two areas. First, research on water treatment of brine produced in conjunction with gas and secondly, a test of the resource base of a watered out reservoir through a recently drilled, co-funded GRI/industry well, the Louise Unit No. 2.

8J. Physical Oceanography

514,770

N85-13446/8/GAR PC **A05/MF A01**
Jet Propulsion Lab., Pasadena, CA.
Multisensor Satellite Data Integration for Sea Surface Wind Speed and Direction Determination.
Final Report.
D. L. Glackin, G. G. Pihos, and S. L. Wheelock. 30 Mar 84, 80p NAS 1.26:174162, NASA-CR-174162
Contract NAS7-918
Sponsored in Part by the Department of the Navy.

Techniques to integrate meteorological data from various satellite sensors to yield a global measure of sea surface wind speed and direction for input to the Navy's operational weather forecast models were investigated. The sensors were launched or will be launched, specifically the GOES visible and infrared imaging sensor, the Nimbus-7 SMMR, and the DMSP SSM/I instrument. An algorithm for the extrapolation to the sea surface of wind directions as derived from successive GOES cloud images was developed. This wind veering algorithm is relatively simple, accounts for the major physical variables, and seems to represent the best solution that can be found with existing data. An algorithm for the interpolation of the scattered observed data to a common geographical grid was implemented. The algorithm is based on a combination of inverse distance weighting and trend surface fitting, and is suited to combing wind data from disparate sources.

514,771

PB85-139517/GAR PC **E03/MF E03**
Institute of Oceanographic Sciences, Wormley (England).
RRS FREDERICK RUSSELL Cruise 2/83, 14 January - 8 February 1983. Mooring and CTD Work Along the Continental Slope off the Hebrides and Shetland Isles,
J. B. Rae. 1984, 13p CRUISE-158

The main objectives of this cruise were to recover and redeploy current meter and thermistor chain moorings along the Hebrides and Shetland continental slope previously deployed during RRS Challenger cruises 12/82 and 15/82 as part of the CONSLEX program. Additional objectives were to carry out CTD and bathymetric surveys in the vicinity of the moorings and along the shelf edge.

8K. Seismology

514,772

NUREG/CR-4058-V1/GAR PC **A03/MF A01**
Geological Survey of Alabama, University.
Study of Seismicity and Earthquake Hazard in Northern Alabama and Adjacent Parts of Tennessee and Georgia.
Annual rept. May 82-Aug 83,
A. M. Dainty, L. T. Long, and J. Liow. Dec 84, 45p
Prepared in cooperation with Georgia Inst. of Tech., Atlanta. School of Geophysical Sciences.

The Georgia Tech-Geological Survey of Alabama Seismic Network has been in operation in Alabama since April 1981 and in southeast Tennessee since April 1982. During this time 83 events have been located. In Alabama, the distribution of epicenters generally confirms a broad northeast-southwest trend and a north-south trend. In southeast Tennessee, four trends running approximately east-west were noted.

514,773

PB85-144616/GAR PC **A04/MF A01**
Agency for International Development, Washington, DC.
Azores Earthquake Reconstruction, January 1, 1980: A Report after Two and One Half Years,
A. Shapleigh, and M. Sterne. Sep 82, 70p AID-PN-AAM-214

On January 1, 1980 a major earthquake rocked the Azores archipelago. This report details relief and reconstruction efforts undertaken following the disaster and the lessons taught by the experience. Background information on the Azores at the time of earthquake and on the latter's economic and social consequences are sketched and Portuguese and U.S. government and private relief operations are detailed. The reconstruction program, which focused quickly on housing, is reviewed and assessed with regard to temporary housing solutions, the incentives provided the private sector for permanent rebuilding, and public housing projects. Target areas for future reconstruction work are enumerated.

8L. Snow, Ice, and Permafrost

514,774

AD-A148 986/3/GAR PC **A09/MF A01**
Cold Regions Research and Engineering Lab., Hanover, NH.
MIZEX (Marginal Ice Zone Program): A Program for Mesoscale Air-Ice-Ocean Interaction Experimemts om Arctic Marginal Ice Zones. V. MIZEX 84. Summer Experiment PI (Principal Investigator) Preliminary Reports,
O. M. Johannessen, and D. A. Horn. Oct 84, 185p
Rept no. CRREL-SR-84-29
See also AD-A148 255.

Contents: Oceanography; Ice; Meteorology; Remote Sensing; Acoustics; Biology.

514,775

N85-13358/5/GAR PC **A02/MF A01**
Hawaii Univ., Honolulu.

Ice-Soil Mixtures: Visual and Near-Infrared Remote Sensing Techniques.
Final Report.
R. N. Clark. 22 Feb 84, 21p NAS 1.26:174087, PGD-PUB-369, NASA-CR-174087
Contract NAGW-115
Presented at the 4TH Inter. Conf. On Permafrost.

The spectral properties of ice soil mixtures are reviewed. Water ice has an absorption coefficient which varies by several orders of magnitude in the visual and near infrared, and has several prominent overtone absorptions. Different wavelengths can be used to probe to different depths in the surface as well as for different mineral impurity concentrations. Empirical and/or theoretical models might be used to derive characteristics grain size of the ice or of the impurity minerals and to derive abundance of the ice and rock or soil components. Quantitative analysis of remotely obtained reflectance spectra can only be performed by using absorption features in the spectra of ice and soil, and not by broadband response. It is suggested that this might be done by special selection of several narrow band filters in the near infrared which will adequately define the ice absorptions.

514,776
N85-13448/4/GAR PC **A06**/MF **A01**
Florida State Univ., Tallahassee. Mesoscale Air-Sea Interaction Group.
Dynamics of Coupled Ice-Ocean System in the Marginal Ice Zone: Study of the Mesoscale Processes and of Constitutive Equations for Sea Ice.
S. Hakkinen. Dec 84, 103p NAS 1.26:174171, NASA-CR-174171
Contracts NAG5-219, N00014-82-C-0404

This study is aimed at the modelling of mesoscale processed such as up/downwelling and ice edge eddies in the marginal ice zones. A 2-dimensional coupled ice-ocean model is used for the study. The ice model is coupled to the reduced gravity ocean model (f-plane) through interfacial stresses. The constitutive equations of the sea ice are formulated on the basis of the Reiner-Rivlin theory. The internal ice stresses are important only at high ice concentrations (90-100%), otherwise the ice motion is essentially free drift, where the air-ice stress is balanced by the ice-water stress. The model was tested by studying the upwelling dynamics. Winds parallel to the ice edge with the ice on the right produce upwilling because the air-ice momentum flux is much greater that air-ocean momentum flux, and thus the Ekman transport is bigger under the ice than in the open water. The upwelling simulation was extended to include temporally varying forcing, which was chosen to vary sinusoidally with a 4 day period. This forcing resembles successive cyclone passings. In the model with a thin oceanic upper layer, ice bands were formed.

8M. Soil Mechanics

514,777
AD-A148 886/5/GAR PC **A04**/MF **A01**
Naval Civil Engineering Lab., Port Hueneme, CA.
XSP(Experimental Static Penetrometer) Cone Penetrometer: A Performance Evaluation.
Rept. for Mar 80-Jan 83,
R. M. Beard, and B. A. Johnson. Oct 84, 64p Rept no. NCEL-TR-911

A lightweight seafloor soil test device has been developed that is capable of performing in-situ cone penetration tests (CPT) to 40-foot sediment depth in up to 200-foot water depths. This device, called the XSP (experimental static penetrometer), weights 10,000 pounds and stands 50 feet tall. The water-jetting system, a unique feature, assists penetration to greater depths than is possible with the 10,000-pound reaction force available. The performance of the XSP has been evaluated in approximately 60 at-sea tests, and the penetrometer has proven reliable and produces repeatable data, which compare favorably with cores taken at the test sites. The water-jetting system aids penetration but does not effect the data. These XSP-supplied CPT data can be used to determine soil classification, relative density and friction angle in sand, and undrained shear strength in clay. They can also be used in the design of foundations (especially pile design) and in bearing capacity and settlement calculations.

514,778
AD-A148 944/2/GAR PC **A10**/MF **A01**
Army Engineer Waterways Experiment Station, Vicksburg, MS. Geotechnical Lab.
Investigation of Density Variation in Triaxial Test Specimens of Cohesionless Soil Subjected to Cyclic and Monotonic Loading.
Final rept.,
P. A. Gilbert. Sep 84, 221p Rept no. WES/TR/GL-84-10

The undrained cyclic triaxial test is widely used to evaluate the seismically induced liquefaction potential of saturated cohesionless soil. Concern that internal void ratio changes (redistribution) due to testing characteristics may render the test inappropriate for dynamic analysis prompted research to investigate such changes. This report describes equipment and procedures to: (a) Prepare sand specimens of known average density or void ratio to a high degree of uniformity. (b) Load specimens under undrained (constant volume) conditions to various pore pressure and strain responses. (c) Freeze specimens under test conditions in such manner that the soil skeleton is not disturbed by the freezing process. (d) Dissect frozen specimens to establish spatial density distribution. (e) Conduct control test involving steps a, c, and d only.

514,779
AD-A148 946/7/GAR PC **A02**/MF **A01**
Army Engineer Waterways Experiment Station, Vicksburg, MS. Environmental Lab.
Environmental Impact Research Program. Restoration of Pyritic Soils and the Quantification of Erosion Control.
Final rept.,
C. R. Lee, and J. G. Skogerboe. Oct 84, 24p Rept no. WES/MP/EL-84-7
Presented at the Symposium on Surface Mining, Hydrology, Sedimentology, and Reclamation (1983) Held at Lexington, Kentucky on 27 Nov-2 Dec 83.

Two papers published in the proceedings of the 1983 Symposium on Surface Mining, Hydrology, Sedimentology and Reclamation sponsored by the University of Kentucky are presented. The papers entitled 'Vegetative Restoration of Pyritic Soils' and 'Quantification of Erosion Control and Runoff Water Quality from Pyritic Soil Restoration Demonstration Plots'. The first paper presents the results of a pyritic soil restoration project designed to demonstrate restoration methods described in Instruction Report EL-84-1, Restoration of Problem Soil Materials at CE Construction Sites, 'developed at the U.S. Army Engineer Waterways Experiment Station (WES)'. Restoration methods include the use of soil amendments and adapted species for long-term establishment of grasses, legumes, and woody species for erosion control. The second paper describes a technique employing the WES rainfall simulator to quantify the effectiveness of restoration techniques for controlling erosion and runoff water quality. A laboratory rainfall simulator lysimeter system was developed for estimating soil loss from disturbed soils. These data were then verified in the field using the mobile WES rainfall simulator on the demonstration plots.

514,780
PAT-APPL-6-637 241/GAR PC **A02**/MF **A01**
Department of Agriculture, Washington, DC.
Soil Sampling Apparatus.
Patent Application,
E. J. Wehunt, C. S. Helling, J. Feldmesser, and W. R. Joyner. Filed 2 Aug 84, 15p PB85-141760
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This invention relates to an apparatus for determining the fate of substances in soil and more particularly to an apparatus for obtaining uncontaminated soil samples and for eliminating a source of contamination.

514,781
PB85-142669/GAR PC **A03**/MF **A01**
CODEL, Inc., New York.
Simple Assessment Techniques for Soil and Water.
T. S. Wood, and G. Tillman. 1980, 37p AID-PN-AAM-643

Low-technology environmental analysis, while primitive and lacking in precision, can provide developing country planners with a surprising amount of valuable information. This booklet, prepared for a workshop on environmental factors in small-scale development projects, describes simple soil and water testing techniques for use when detailed environmental impact studies are not feasible. Instructions are provided for measuring soil pH and texture, water percolation and infiltration rates, and the presence in water of dissolved minerals, sodium, and coliform bacteria.

9. ELECTRONICS AND ELECTRICAL ENGINEERING

9A. Components

514,782
AD-A149 001/0/GAR PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
Metal-Semiconductor Field-Effect Transistors Fabricated in GaAs Layers Grown Directly on SI Substrates by Molecular Beam Epitaxy.
Journal article,
G. M. Metze, H. K. Choi, and B. Y. Tsaur. 15 Nov 84, 4p JA-5656, ESD-TR-84-286
Contract F19628-80-C-0002
Pub. in Applied Physics Letters, v45 n10 p1107-1109, 15 Nov 84.

No abstract available.

514,783
AD-A149 040/8/GAR PC **A04**/MF **A01**
Wisconsin Univ.-Madison. Mathematics Research Center.
Asymptotic Representation of Solutions of the Basic Semiconductor Device Equations.
Technical summary rept.,
P. A. Markowich, and C. Schmeiser. Nov 84, 74p Rept no. MRC-TSR-2772
Contract DAAG29-80-C-0041

In this paper the basic semiconductor device equations modelling a symmetric one-dimensional voltage-controlled diode are formulated as a singularly perturbed two point boundary value problem. The perturbation parameter is the normed Debye-length of the device. The authors derive the zeroth and first order terms of the matched asymptotic expansion of the solutions, which are the sums of uniformly smooth outer terms (reduced solutions) and the exponentially varying inner terms (layer solutions). The main result of the paper is that, if the perturbation parameter is sufficiently small then there exists a solution of the semiconductor device problem which is approximated uniformly by the zeroth order term of the expansion, even for large applied voltages. This result shows the validity of the asymptotic expansions of the solutions of the semiconductor device problem in physically relevant high-injection conditions.

514,784
AD-A149 083/8/GAR PC **A03**/MF **A01**
Materials Research Labs., Ascot Vale (Australia).
Railgun Plasma Armature Characterisation Experiments.
D. D. Richardson. May 84, 30p Rept no. MRL-R-928

A Plasma Armature Characterisation Experiment (PACE) is described. The PACE device is designed to study the plasma armature of railguns and yields information on properties such as temperature, pressure, densities, plasma potential and ion species with their degrees of ionisation. The main experimental studies are by spectroscopy of the light emitted and by Langmuir probes. The device simulates the plasma moving

behind the projectile in a railgun by a static plasma held by electromagnetic forces against a fixed wall. Results to date demonstrate the feasibility of the concept and indicate improvements to the device which will ensure that much useful information is difficult to acquire by other means.

514,785
DE84017414/GAR PC A02/MF A01
Lawrence Livermore National Lab., CA.
Adaptation of an Air-Dielectric RF Cable for Use as an Oil-Filled High Voltage Pulse Transmission Line.
W. C. Weiss, R. L. Copp, L. L. Reginato, and J. A. Schmidt. Nov 84, 7p UCRL-90670, CONF-8411103-1
Contract W-7405-ENG-48
International wire and cable symposium, Reno, NV, USA, 13 Nov 1984.
Portions are illegible in microfiche products.

This paper describes the specifications, conceptual design, prototype testing and operating experience of an oil-filled high voltage pulse transmission cable adapted from commercially available air-dielectric RF components. Lawrence Livermore National Laboratory's Advanced Test Accelerator (ATA) requires a method of transmitting 250kV, 70 nanosecond pulses from the power conditioning equipment to the accelerator. The oil-filled cable approach was chosen over alternative concepts because of its high voltage holding capacity, long life and flexibility. The criteria for cable and connector design are discussed. The results of prototype testing and performance of the final design are presented. (ERA citation 10:002220)

514,786
DE85000926/GAR PC A02/MF A01
General Dynamics, San Diego, CA. Convair Div.
Generalized Multidemensional Propagation Velocity Equations for Pool-Boiling Superconducting Windings.
E. H. Christensen, and J. M. O'Loughlin. Sep 84, 21p UCRL-15633
Contract W-7405-ENG-48

Several finite difference, finite element detailed analyses of propagation velocities in up to three dimensions in pool-boiling windings have been conducted for different electromagnetic and cryogenic environments. Likewise, a few full scale simulated winding and magnet tests have measured propagation velocities. These velocity data have been correlated in terms of winding thermophysical parameters. This analysis expresses longitudinal and transverse propagation velocities in the form of power function regression equations for a wide variety of windings and electromagnetic and thermohydraulic environments. The generalized velocity equations are considered applicable to well-ventilated, monolithic conductor windings. These design equations are used piecewise in a gross finite difference mode as functions of field to predict the rate of normal zone growth during quench conditions. A further check of the validity of these predictions is available through total predicted quench durations correlated with actual quench durations of large magnets. (ERA citation 10:001655)

514,787
DE85001327/GAR PC A02/MF A01
Oak Ridge National Lab., TN.
Program Plan for Research and Development of Dielectric Materials for Electric Power Systems.
Oct 84, 11p DOE/OR/21400-3
Contract AC05-84OR21400
Portions are illegible in microfiche products. Original copy available until stock is exhausted.

This program is intended to further the fundamental understanding of dielectric materials, as well as to provide a data base for the development and application of these materials. Dielectric materials will be developed for future electric power equipment that will have improved efficiency and reliability. This program plan provides a comprehensive description of the DOE/EES R and D program for dielectric materials. The specific objectives of the program are (1) to develop a fundamental understanding of the mechanisms occurring within dielectric materials and interfacial phenomena, (2) to develop dielectric materials and concepts and determine performance characteristics, and (3) to provide for technology transfer of materials and concepts for application by the electric power industry. Oak Ridge National Laboratory will assist the EES in managing the program. The R and D projects will be performed primarily by the private sector (industry and universities). (ERA citation 10:002206)

514,788
DE85001377/GAR PC A04/MF A01
Southern California Edison Co., Rosemead.
Medium Power Transformers, 115 KV and Below with and Without LTC.
23 Mar 79, 52p DOE/SF/10501-016, STMPO-493
Contract FC03-77SF10501
Portions are illegible in microfiche products.

Technical requirements for the design, manufacture, and test of outdoor, oil-immersed, 60 Hz, Class OA, OA/FA, and OA/FA/FA, single and three-phase, medium power transformers are specified. (ERA citation 10:002207)

514,789
DE85001669/GAR PC A02/MF A01
Oak Ridge National Lab., TN.
Startup of Large Coil Test Facility.
P. N. Haubenreich, R. E. Bohanan, W. A. Fietz, J. N. Luton, and J. R. May. 1984, 6p CONF-840915-6
Contract AC05-84OR21400
13. symposium on fusion technology, Varese, Italy, 24 Sep 1984.
Portions are illegible in microfiche products.

The Large Coil Test Facility (LCTF) is being used to test superconducting toroidal field coils about one-third the size of those for INTOR. Eventually, six different coils from four countries will be tested. Operations began in 1983 with acceptance testing of the helium refrigerator/liquefier system. Comprehensive shakedown of the facility and tests with the first three coils (from Japan, the United States, and Switzerland) were successfully accomplished in the summer of 1984. Currents up to 10,200 A and fields up to 6.4 T were reached. Data were obtained on performance of refrigerator, helium distribution, power supplies, controls, and data acquisition systems and on the acoustic emission, voltages, currents, and mechanical strains during charging and discharging the coils. (ERA citation 10:001605)

514,790
NUREG/CR-3791/GAR PC A04/MF A01
PARAMETER, Inc., Elm Grove, WI.
Closeout of IE Bulletin 79-09: Failures of GE Type AK-2 Circuit Breakers in Safety-Related Systems.
Final rept. 12 Sep 83-26 Oct 84,
R. S. Dean, W. J. Foley, W. R. Mills, and A. Hennick. Jan 85, 54p PARAMETER/IE-137

Twelve failures of General Electric Type AK-2 safety-related circuit breakers reported in 1975, 1978 and 1979 are described in IE Bulletin 79-09. Because of these failures, the bulletin was issued April 17, 1979 to require responses and specific actions by all licensees and holders of construction permits. The failures were attributed to either binding within the linkage mechanism of the undervoltage trip device and trip shaft assembly or faulty adjustment of that linkage mechanism. It was concluded that the twelve failures resulted from inadequate preventive maintenance. Because many occurrences of the same kind happened after 1979, a significant number of later NRC documents which are included in Appendix A were issued. The bulletin has been closed out for 101 of the 129 current facilities which reported either that they had no Type AK-2 breakers in safety-related systems or none with undervoltage trip devices. Proposed followup items for the remaining 28 current facilities are presented in Appendix C. Because followup is based on the requirements of later Bulletins 83-04 and 83-08, Bulletin 79-09 is considered closed.

514,791
N85-13044/1/GAR PC A02/MF A01
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Effect of Barrier Height on Friction Behavior of the Semiconductors Silicon and Gallium Arsenide in Contact with Pure Metals.
H. Mishina, and D. H. Buckley. Dec 84, 12p NAS 1.60:2405, E-2219, NASA-TP-2405

Friction experiments were conducted for the semiconductors silicon and gallium arsenide in contact with pure metals. Polycrystalline titanium, tantalum, nickel, palladium, and platinum were made to contact a single crystal silicon (111) surface. Indium, nickel, copper, and silver were made to contact a single crystal gallium arsenide (100) surface. Sliding was conducted both in room air and in a vacuum of 10 to the minus 9th power torr. The friction of semiconductors in contact with metals depended on a Schottky barrier height formed at the metal semiconductor interface. Metals with a higher barrier height on semiconductors gave lower friction. The effect of the barrier height on friction behavior for argon sputtered cleaned surfaces in vacuum was more specific than that for the surfaces containing films in room air. With a silicon surface sliding on titanium, many silicon particles back transferred. In contrast, a large quantity of indium transferred to the gallium arsenide surface.

514,792
N85-13166/2/GAR PC A02/MF A01
Centre National d'Etudes Spatiales, Toulouse (France).
Les Transistors MOS de Puissance (Metal Oxide Semiconductors Power Transistors).
B. Cluzel. 10 May 84, 25p CNES-84/QPE/FT/190
Text in French.

Production technologies for MOS power transistor are described. The characteristics of MOS power and bipolar transistors are evaluated. The equivalent electrical circuits are analyzed. Sensibility to space environment radiation is discussed. The advantages of a cascade combination of MOS-bipolar transistor are shown. It is estimated that 30% of the demand for power transistors demand will be met by MOS transistors by 1987.

514,793
N85-13171/2/GAR PC A03/MF A01
Foersvarets Forskningsanstalt, Stockholm (Sweden).
Pulse Injection on a Power Cable Penetrating a Shielding Wall by Feed-Through Capacitors.
S. Garmland, T. Karlsson, and G. Unden. Sep 84, 40p FOA-C-30372-A3
In Swedish; English Summary.

Pulses, similar to those induced by an electromagnetic pulse field, were injected into a power cable penetrating a shielding wall equipped with feed-through capacitors. The transient suppression efficiency was determined by measuring the pulse on both sides of two different capacitors. Measured voltage agrees with calculated residual voltage, supposing ideal filter characteristics. Feed-through capacitors are demonstrated to have a unique capability of eliminating effectively the high frequency coupling between unprotected and protected space. Protected against slowly rising overvoltage by surge arresters, feed-through capacitors are recommended for protection of power installations.

514,794
N85-13172/0/GAR PC A02/MF A01
Societe Nationale Industrielle Aerospatiale, Les Mureaux (France).
Improvement of Lightning Arresters Energy Capability.
B. Trannois. 1984, 5p SNIAS-842-422-104
Presented at EMC 84, Tokyo, 16-18 Oct. 1984.

A very fast circuit shorter for high current levels was developed. Time to short circuit is 3 msec; short circuit current characteristics is 100 KA peak current (160 KA maximum value); overheating characteristics during 100 msec 30 KA (64 KA maximum value); service voltage up to 1400 V RMS; and dielectric insulation up to 3800 V. It is not a substitute for surge arresters, since it is not designed for high voltages. An arrester with microsec response ensures the voltage control of the line, and drives to ground the immediate part of the current, then the circuit shorter can work within a low voltage environment, and drive to ground the major (in term of Coulombs) part of the current, and prevent degradation to the surge arrester. Where a permanent power service is wanted, this device can be completed with a self opening of circuit shorter with a time delay to prevent the operation of circuit breakers.

514,795
PAT-APPL-6-664 193/GAR PC A03/MF A01
Department of the Air Force, Washington, DC.
Improved Magnetic Bias and Delay Linearity in a Magnetostatic Wave Delay Line.
Patent Application,
K. K. Jin. Filed 24 Oct 84, 33p AD-D011 441/3
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A cascade combination of magnetostatic delay line elements operating in different signal propagation

modes for the purpose of achieving dispersion cancellation: magnetic bias control of the attained frequency-dependent delay and a magnetic bias field establishing apparatus for providing the tubular, laminar magnetic flux needed for backward volume wave operation of a magnetostatic delay element are also included. (Author)

514,796
PB85-151678 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Comments on 'Determining Specific Contact Resistivity from Contact End Resistance Measurements'.
Final rept.,
J. A. Mazer, and L. W. Linholm. Sep 84, 2p
Pub. in IEEE (Institute of Electrical and Electronics Engineers) Electron Device Letters EDL-5, n9 p347-348 Sep 84.

A recent letter in this journal by Chern and Oldham discussed a method of determining specific contact resistance from measurements on a specifically designed test structure. The purpose of this letter is to comment on the application of the transmission-line model (TLM) in that letter and to comment on the interpretation of other work, specifically that of Proctor and Linholm that appears in that letter.

514,797
PB85-854776/GAR PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Electromagnetic Shielding. 1970-February 1985 (Citations from the U. S. Patent Data Base).
Rept. for 1970-Feb 85.
Feb 85, 103p

This bibliography contains citations of selected patents concerning fabrication techniques and utilization of electromagnetic shielding to prevent inadvertent emission or admission of electromagnetic radiation. Materials and design aspects of shielding are included, as well as a variety of applications and manufacturing methods. Applications include electronic component housings and packaging, display devices, and microwave oven doors. (Contains 131 citations fully indexed and including a title list.)

514,798
PB85-855096/GAR PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Power MOSFETS. 1977-February 1985 (Citations from the INSPEC: Information Services for the Physics and Engineering Communities Data Base).
Rept. for 1977-Feb 85.
Feb 85, 151p

This bibliography contains citations concerning the technology and characteristics of power MOSFETS. Principles, design aspects, technology development, and a variety of applications are considered. (Contains 203 citations fully indexed and including a title list.)

514,799
PB85-855161/GAR PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Radiation Hardening of Semiconductor Devices. 1976-January 1985 (Citations from the Energy Data Base).
Rept. for 1976-Jan 85.
Feb 85, 135p
Supersedes PB84-862887. Prepared in cooperation with Department of Energy, Washington, DC.

This bibliography contains citations concerning the radiation hardening of semiconductor devices. Radiation hardening is a design, material, and fabrication problem for individual semiconductor components, and is not generally solvable by shielding. Citations on shielding are not included in this bibliography. Applications for radiation-hardened semiconductor devices include environments in nuclear power plants and in space. (This updated bibliography contains 165 citations, 16 of which are new entries to the previous edition.)

514,800
PB85-855385/GAR PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Hall Effect Devices. 1975-February 1985 (Citations from the INSPEC: Information Services for the Physics and Engineering Communities Data Base).
Rept. for 1975-Feb 85.
Feb 85, 168p
Supersedes PB84-862416.

This bibliography contains citations concerning design, development, characteristics, and performance of a wide variety of hall effect devices and related circuits and components for various applications, including magnetic field strength measurement and aspect sensing. (This updated bibliography contains 228 citations, 15 of which are new entries to the previous edition.)

9B. Computers

514,801
AD-A148 855/0/GAR PC **A15**/MF **A01**
SofTech, Inc., Waltham, MA.
Ada (Trademark) Primer.
Nov 84, 339p
Contract DAAB07-83-C-K514
Supersedes report dated Jan 84, AD-A140 660.

Ada is a high order language (HOL) developed by the Department of Defense (DoD) to be used in programming embedded systems. It is anticipated that use of Ada will significantly reduce the costs associated with defense software by providing more maintainable code. One of the goals of this workbook is to illustrate how to use the features of the Ada language to help produce more maintainable code. Ada Primer is the first of a series of three workbooks. It leads the novice through the fundamentals of Ada by addressing the so-called PASCAL subset of Ada. This workbook may be used in conjunction with module L202, Basic Ada Programming. A student, having completed L202 in conjunction with this workbook, shall be able to use an Ada package and code Ada subprograms using the Pascal subset of Ada. With the exception of Section 1 of this workbook, each workbook is organized as a series of Ada exercises to be solved by the reader. This workbook is intended for those individuals who have either a Bachelor's Degree in one of the sciences (with Computer Science courses included), an Associate in Arts Degree in Computer Science, or a strong background in high order languages such as Pascal, FORTRAN, JOVIAL, or CMS-2.

514,802
AD-A148 880/8/GAR PC **A02**/MF **A01**
Pittsburgh Univ., PA. Inst. for Computational Mathematics and Applications.
Program Design for an Adaptive, Non-Linear Finite Element Solver.
Technical rept.,
F. R. Sledge, and W. C. Rheinboldt. 1984, 19p Rept no. ICMA-84-68
Contract N00014-80-C-0455

An experimental software system for the solution of a class of non-linear, stationary boundary-value problems is currently under development at the University of Pittsburgh. The program NFEARS (Non-linear Finite-Element Adaptive Research Solver) is a further development of the program FEARS which utilized bilinear elements to solve linear elliptic problems. NFEARS retains the functionality of the earlier program, but incorporates a continuation procedure to solve non-linear problems, using biquadratic Hermitian elements. The NFEARS design properties include the following: (1) The system constitutes an applications-independent finite-element solver for a certain class of two-dimensional, non-linear, stationary, boundary-value problems defined by a weak mathematical formulation; (2) Adaptive approaches are employed extensively. A posteriori error indicators are used to control the adaptive processes and to provide a solution with near optimal error within a prescribed cost range; (3) In the system design, advantage was taken of the inherent parallelism and modularity of the finite element method. In particular, a two-level data structure has been employed to take maximum advantage of the parallelism in the continuation process; and (4) The system is highly modular in structure, reflecting not only the natural separation by distinct function, but also the isolation of those processes, particularly error analysis, which are anticipated to be of the greatest experimental interest. In this way, the migration of NFEARS from convenient research vehicle to efficient production tool will be gradual and controlled. Extensive provisions for evaluating the performance are incorporated.

514,803
AD-A148 881/6/GAR PC **A18**/MF **A01**
Computer Technology Associates, Inc., Englewood, CO.
Sector Suite Man/Machine Functional Capabilities and Performance Requirements.
Rept. no. 4 (Final),
10 Aug 84, 410p DOT/FAA/AP-84/18
Contract DT-FA01-83-Y-10554

Sector Suite Man/Machine Functional Capabilities and Performance Requirements documents both the Sector Suite (SS) Man/Machine Interface (MMI) Functional Capabilities and the SS Workstation Functional Capabilities. Requirement specifications are defined for SS MMI application processes, user interface language, display management, resource management, error detection/recovery, data base update/retrieval and SS workstation hardware. The controller tasks defined in CDRL A002--Operations Concept for the AAS MMI are further decomposed into task elements which address data inputs and outputs, and task criticality and frequency. These task element statements are then used to derive SS functional requirements. This analysis provides the basis for a conceptual model of interaction, derives the functional capabilities and performance requirements for essential SS hardware and software functions, drives MMI processing capacity and response time requirements, and defines the requirements for MMI data bases and data base management.

514,804
AD-A148 888/1/GAR PC **A06**/MF **A01**
Imperial Software Technology Ltd., London (England).
Distributed Data Processing Design Methodology.
Final technical rept.,
M. Dowson, G. Le Lann, J. Kramer, J. Magee, and M. Sloman. May 84, 102p
Contract DAJA45-83-C-0044

This report discusses approaches to the development of systematic methods for the design of robust real time distributed computer systems. The conclusion of the report outlines an evolutionary approach to the development of a true method for the design of distributed real time systems. It identifies two parallel threads of effort which need to be pursued. The first, developing a calculus of operational requirements, will provide a means of specifying and reasoning about the various requirements. Work in this area could best build on an existing method, progressively enhancing it to cope with the full range of distributed system requirements. The second thread consists of (relatively informal) experimentation with the method as it evolves, exploiting our current understanding and appreciation of the fundamental technical issues of distributed systems. This will feed back into the development of the method itself, by providing a better appreciation of the way in which operational requirements can be addressed.

514,805
AD-A148 892/3/GAR PC **A03**/MF **A01**
Construction Engineering Research Lab. (Army), Champaign, IL.
Graphics Translators for Computer-Aided Drafting and Design: Interface Alternatives for the A/E Community.
Final rept.,
L. M. Golish, and L. W. Emberley. Nov 84, 43p Rept no. CERL-TR-P-85/03

Increased development and competition in the computer-aided graphics industry has produced many advanced systems for architecture and engineering (A/E). However, this growth in technology has come without standardization, making it difficult or impossible to transfer data between dissimilar systems. Graphics translators are studied for potential in transferring A/E information from one system to another. Two types of translators are considered--direct and neutral--with neutral formats showing more promise industry-wide. Progress by professional organizations in standardizing a neutral graphics translator is discussed. Originator-supplied keywords include: Computer aided design, Computer graphics, and Drafting.

514,806
AD-A148 913/7/GAR PC **A02/MF A01**
Systems Control, Inc., (VT), Palo Alto, CA.
Knowledge based Programming Applications,
C. Green, and B. P. McCune. Feb 79, 6p
Contract N00014-79-C-0127

This paper describes the knowledge based approach to program acquisition and synthesis, and is based upon an earlier work. Several diverse potential applications are mentioned, including synthesizing the harmonic-set formation module of an acoustic signal understanding system for knowledge based ship classification, creating retrieval and analysis programs for ship classification hypothesis structures, and making operating systems and programming languages more portable.

514,807
AD-A148 916/0 Not available NTIS
Massachusetts Univ., Amherst. Dept. of Computer and Information Science.
Debugging Tool for Distributed Systems,
P. C. Bates, J. C. Wileden, and V. R. Lesser. 1983, 5p
Grants NSF-MCS80-06327, NAG1-115
Availability: Pub. in IEEE, p311-315 1983 (No copies furnished by DTIC/NTIS).

No abstract available.

514,808
AD-A148 926/9 Not available NTIS
Massachusetts Univ., Amherst. Dept. of Computer and Information Science.
Functionally Accurate, Cooperative Distributed Systems,
V. R. Lesser, and D. D. Corkill. Jan 81, 16p
Contract N00014-79-C-0439, Grant NSF-MCS78-04212
Availability: Pub. in IEEE Transactions on Systems, Man, and Cybernetics, vSMC-11 n1 p81-96 Jan 81 (No copies furnished by DTIC/NTIS).

No abstract available.

514,809
AD-A148 963/2/GAR PC **A04/MF A01**
Massachusetts Inst. of Tech., Cambridge. Research Lab. of Electronics.
Object-Oriented Signal Processing Environment: The Knowledge-Based Signal Processing Package.
Technical rept.,
W. P. Dove, C. Myers, and E. E. Milios. Oct 84, 75p Rept no. TR-502
Contract N00014-81-K-0742

A LISP-based signal processing package for integrated numeric and symbolic manipulation of discrete-time signals is described. The package is based on the concept of 'signal abstraction' in which a signal is defined by its non-zero domain and by a method for computing its samples. Most common signal processing operations are defined in the package and the package provides simple methods for the definition of new operators. The package provides facilities for the manipulation of infinite duration signals and periodic signals, for the efficient computation of signals over intervals, and for the catching of signal values. The package is currently being expanded to provide for manipulation of continuous-time signals and symbolic signal transformations, such as the Fourier transform, to form the basis of knowledge-based signal processing systems.

514,810
AD-A148 987/1/GAR PC **A09/MF A01**
Massachusetts Inst. of Tech., Cambridge. Artificial Intelligence Lab.
Qualitative Process Theory.
Technical rept.,
K. D. Forbus. Jul 84, 183p Rept no. AI-TR-789
Contract N00014-80-C-0505
Doctoral thesis.

Objects move, collide, flow, bend, heat up, cool down, stretch, compress, and boil. These and other things that cause changes in objects over time are intuitively characterized as processes. To understand common sense physical reasoning and make programs that interact with the physical world as well as people do we must understand qualitative reasoning about processes, when they will occur, their effects, and when they will stop. Qualitative Process theory defines a simple notion of physical process that appears useful as a language in which to write dynamical theories. Reasoning about processes also motivates a new qualitative representation for quantity in terms of inequalities, called the quantity space. This report describes the basic components of Qualitative Process theory, several different kinds of reasoning that can be performed with them, and discusses its impact on other issues in common sense reasoning about the physical world, such as casual reasoning and measurement interpretation. Several extended examples illustrate the utility of the theory, including figuring out that a boiler can blow up, that an oscillator with friction will eventually stop, and how to say that you can pull with a string, but not push with it. This report also describes GIZMO, an implemented computer program which uses Qualitative Process theory to make predictions and interpret simple measurements. The representations and algorithms used in GIZMO are described in detail, and illustrated using several examples. (Author).

514,811
AD-A148 990/5/GAR PC **A06/MF A01**
Massachusetts Inst. of Tech., Cambridge. Lab. for Computer Science.
Cohesion in Computer Text Generation: Lexical Substitution.
Trip rept.,
R. A. Granville. May 83, 120p Rept no. MIT/LCS/TR-310
Contract N00014-80-C-0505

This report describes Paul, a computer text generation system designed to create cohesive text. The device used to achieve this cohesion is lexical substitution. Through the use of syntactic and semantic information, the system is able to determine which type of lexical substitution will provide the necessary information to generate an understandable reference, while not providing so much information that the reference is confusing or unnatural. Specifically, Paul is designed to deterministically choose between pronominalization, superordinate substitutions, and definite noun phrase reiteration. The system identifies a strength of antecedence recovery for each of the lexical substitutions, and matches them against the strength of potential antecedence of each element in the text to select the proper substitutions for these elements. There are five classes of potential antecedence based on the element's current and previous syntactic roles, semantic case roles, and the current focus of the discourse. Through the use of these lexial substitutions, Paul is able able to generate a cohesive text which exhibits the binding of sentences through presupposition dependencies, the marking of old information from new, and the avoiding of unnecessary and tedious repetitions.

514,812
AD-A149 005/1/GAR PC **A06/MF A01**
David W. Taylor Naval Ship Research and Development Center, Bethesda, MD. Computation, Mathematics and Logistics Dept.
Computer Center CDC Libraries.
Final rept.,
D. V. Sommer, and S. E. Good. Jun 84, 124p Rept no. DTNSRDC/CMLD-84-11

The Computer Center CDC Libraries (CLIB) manual is a cross reference volume for many subprograms, programs, utilities and procedures available on the CDC cyber 170 computers at DTNSRDC. CLIB lists the routines by functional category and alphabetically, by library, with descriptive titles.

514,813
AD-A149 007/7/GAR PC **A05/MF A01**
Yale Univ., New Haven, CT. Dept. of Computer Science.
Managing Permanent Objects.
Technical rept.,
N. Mishkin. Nov 84, 90p Rept no. YALEU/DCS/RR-338
Contract N00014-82-K-1054, Grant NSF-MCS81-16678

This work describes a programming system that facilitates the management of data objects that live across multiple invocations of programs that read and modify those objects; we call such data objects permanent objects. Typically, programmers needing to save data objects permanently do so either (1) by writing an ad hoc set of procedures that convert their data from some internal representation to some external representation (and back), or (2) by interfacing their programs with an existing database system. We discuss the problems encountered by a programmer adopting either of these strategies, and we describe our system whose design is an attempt to strike a balance between the flexibility of the ad hoc approach and the rigidity of the approach that employs a database. A key goal of our work is the design and implementation of a system that makes the manipulation of permanent objects nearly as easy and flexible as the manipulation of 'transient' objects - i.e. the memory resident data structures that programmers are accustomed to dealing with. We wish to hide the details associated with the fact that permanent objects must have their permanent home in a disk file system.

514,814
AD-A149 036/6/GAR PC **A04/MF A01**
BDM Services Co., Monterey, CA.
Data Base Development for Ship Readiness Analyses.
Final technical rept. Aug-Nov 84,
W. H.King, and D. C. Zimmerman. Nov 84, 68p Rept no. BMD/M-TR-0056-84
Contract N00014-82-C-0251

Files were constructed at the Defense Manpower Data Center (DMDC) for analysis of ship readiness. Navy enlisted personnel attached to the ships in each observed ship class, were selected. Service-entry information was supplemented with updated quarterly data, for the quarters ended 7609 to 8303, resulting in individual longitudinal records. The Active Duty Military Master and Loss Edit Provided the entry and quarterly information for each record. Extractions from the 2754 position file were made for computational purposes. In addition, binary coding format was converted to character format on tapes sent to the Center for Naval Analysis (CNA) to meet computer system specifications. These files were used to examine personnel attributes in relation to ship readiness, but also provide excellent sources of data for a variety of applications.

514,815
AD-A149 064/8/GAR PC **A02/MF A01**
Massachusetts Univ., Amherst. Dept. of Computer and Information Science.
Meta-Level Control through Fault Detection and Diagnosis,
E. Hudlicka, and V. R. Lesser. 30 May 84, 23p
Contract N00014-79-C-0439, Grant NSF-MCS83-06327

Control strategies in most complex problem-solving systems, though highly parameterized, are not adaptive to the characteristics of the particular task being solved. If the characteristics of the task are atypical, a fixed control strategy may cause incorrect or inefficient processing. This document presents an approach for adapting the control strategy by introducing a meta-level control component into the problem-solving architecture. This meta-level control component is based on the paradigm of Fault Detection/Diagnosis. The authors presentation will concentrate on modeling the problem-solving system and on the inference techniques necessary to use this model for diagnosis. They feel that meta-level control based on the Fault Detection/Diagnosis paradigm represents a new approach to introducing more sophisticated control into a problem-solving system. (Author)

514,816
AD-A149 065/5/GAR PC **A02/MF A01**
Massachusetts Univ., Amherst. Dept. of Computer and Information Science.
Distributing a Distributed Problem Solving Network Simulator,
E. H. Durfee, D. D. Corkill, and V. R. Lesser. May 84, 24p
Contract N00014-79-C-0439, Grant NSF-MCS78-04212

We describe our experience in improving the real-time performance of a particular large and complex simulator through distributed processing. Our goal was to both reduce the real time required and to increase the scope of the simulations by splitting the existing simulator (written in Lisp) to run on a network of VAX 11/750s connected by DECNet/ETHERNET-II. We present data showing that the additional CPU power and the combined physical memory available in the network contribute to significant real-time speedup. Experience with a two and three machine network indicates that there was no memory contention in a single

process simulator, we obtain a speedup proportional to the number of processes. Where there was memory contention in the single process simulator, the speed up is much more dramatic. We also detail the capabilities that were added to the conventional network communication structure to implement, debug, and interact with the distributed simulator.

514,817
AD-A149 075/4/GAR PC **A04/MF A01**
Naval Postgraduate School, Monterey, CA.
Man-Machine Interaction: Operator.
Master's thesis,
S. K. Harding. Jun 84, 54p

More people than ever before are using computers. Some use only the home computer while others use large mainframes or both. All computers have an interface with which the person must interact to operate the system correctly. This interface must be designed so that the operator can use the system without wasting time and money. This thesis describes some of the issues which should be considered when designing a man-machine interface, and defines some types of operators and their environments. The issues and their resolution are illustrated by a case study which describes the man-machine interface of an actual United States Navy system in use today.

514,818
AD-A149 076/2/GAR PC **A05/MF A01**
Naval Postgraduate School, Monterey, CA.
Decision Model for Selection of Microcomputers and Operating Systems.
Master's thesis,
K. G. Highfill. Jun 84, 76p

A framework for the construction of an economic analysis model is suggested for the selection of microcomputer hardware and operating systems. The model is suggested in order to guide a prospective Navy microcomputer systems. The model is designed such that common spreadsheet software programs can be utilized to manipulate the model and store data on available systems. In addition, comparisons are made of current popular microcomputer systems and operating systems, in order to provide a frame or reference for the use of the model.

514,819
AD-A149 087/9/GAR PC **A04/MF A01**
Materials Research Labs., Ascot Vale (Australia).
Study of the Requirements of an Electronic Message Handling Facility.
Technical rept.,
J. C. Gwatking, and J. L. Roughan. May 84, 63p
Rept no. MRL-0309-TR

This report describes the initial stage in the provision of a comprehensive information interchange facility on the Defense Research Centre's computer network. It addresses the particular topic of a computer-based scheme for generating, distributing, storing and retrieving messages and identifies the features required. Finally the report describes the design of a system which meets the majority of these requirements and its partial implementation on the Centre's IBM 370 computer. (Author)

514,820
FIPS PUB 8-5/GAR PC **A06/MF A01**
National Bureau of Standards, Gaithersburg, MD.
Metropolitan Statistical Areas (Including CMSAs (Consolidated Metropolitan Statistical Areas), PMSAs (Primary Metropolitan Statistical Areas), and NECMAs (New England County Metropolitan Areas)). Category: Data Standards and Guidelines. Subcategory: Representations and Codes.
Federal information processing standards (Final),
H. Tom. 31 Oct 84, 103p
Supersedes FIPS PUB 8-4.
Three ring vinyl binder also available, North American Continent price $6.25; all others write for quote.

This standard specifies names, principal components, and identification codes for the Metropolitan Statistical Areas (MSAs) of the United States and Puerto Rico, including units called Consolidated Metropolitan Statistical Areas (CMSAs) and Primary Metropolitan Statistical Areas (PMSAs), and related units called New England County Metropolitan Areas (NECMAs). The general concept underlying the definitions of MSAs and related units is that of a geographic area consisting of a large population nucleus together with adjacent communities having a high degree of economic and social integration with that nucleus. This revision supersedes FIPS PUB 8-4 in its entirety.

514,821
N85-13153/0/GAR PC **A03/MF A01**
Foersvarets Forskningsanstalt, Stockholm (Sweden).
Digital Image Processing; Report from a Conference and Study Trip to the USA and Canada, Summer 1984.
G. Borgefors. Sep 84, 34p FOA-C-30369-E1
In Swedish; English Summary.

Geographic information systems and mapping; structures for image processing; artificial intelligence; aids and robots for developing three-dimensional images; biological vision and computerized detection; stereomatching, pattern recognition, and character recognition; and data storage are discussed.

514,822
N85-13356/9/GAR PC **A02/MF A01**
SAR, Inc., Riverdale, MD.
LANDSAT Instruments Characterization.
Y. Lee. Aug 84, 19p NAS 1.26:174123, E85-10032, NASA-CR-174123
Contract NAS5-28200
Erts.

Several studies were performed using LANDSAT-4 and -5 simultaneous overpath data 40608-15472 and 50014-15465 over Pensacola, FL. The overlap region of these two scenes was determined visually on the IAT and then sampled into 32 x 32 segments. The mean and standard deviation (SD) for each segment were calculated. In general, the plots of the means of LANDSAT-4 versus LANDSAT-5 lie on the diagonal line. Some of the data lie out of the diagonal line, which indicates a possible bidirectional observation effect occurs. In addition to editing the five FCL files on CALDUMP tapes into seven 1000 minor frame (MF). CAL files, program LEE.FOR was modified to use information from start of shutter obscuration extracted from program START.FOR to create seven 200 MF.CAL files that can be run through the current TRAPP program for TM sensor characterization. The location of start of shutter obscuration was determined for both LANDSAT-4 and -5.

514,823
N85-13357/7/GAR PC **A02/MF A01**
Arizona Univ., Tucson.
Investigation of Several Aspects of LANDSAT 4/5 Data Quality.
Quarterly Progress Report.
R. C. Wrigley. 20 Sep 84, 10p NAS 1.26:174129, E85-10038, NASA-CR-174129
Contract NCC2-234
Erts.

A technique under development uses a zoom transfer scope to register the photograph of the target with digitally enlarged photographic hardcopy of the TM data using a visual fit to the area surrounding the target. The first attempt using the Sacramento Scene (44/33) of February 1, 1983 indicated that relief displacement in the aerial photography would cause large errors. A second attempt is in progress using the aero-triangulated scene centers which have no relief displacement. Being calculated points, the scene centers have somewhat larger absolute errors in geolocation, approximately 3 meters instead of 1.5 meters. The average TM effective instantaneous field of view (EIFOV) calculated from modulation transfer functions (MTFs) is 52.7 m. This is smaller than the 55 and 65 m EIFOVs reported earlier using noisy MTFs but larger than the EIFOVs from the San Mateo Bridge analysis which ranged from 44.5 to 50.9 m and averaged 47.6 m for the same TM scene.

514,824
N85-13477/3/GAR PC **A02/MF A01**
Michigan Univ., Ann Arbor.
Analysis of the Impact of Error Detection on Computer Performance.
Progress Report.
K. C. Shin, and Y. H. Lee. Aug 83, 24p NAS 1.26:174167, NASA-CR-174167
Contract NAG1-296

Conventionally, reliability analyses either assume that a fault/error is detected immediately following its occurrence, or neglect damages caused by latent errors. Though unrealistic, this assumption was imposed in order to avoid the difficulty of determining the respective probabilities that a fault induces an error and the error is then detected in a random amount of time after its occurrence. As a remedy for this problem a model is proposed to analyze the impact of error detection on computer performance under moderate assumptions. Error latency, the time interval between occurrence and the moment of detection, is used to measure the effectiveness of a detection mechanism. This model is used to: (1) predict the probability of producing an unreliable result, and (2) estimate the loss of computation due to fault and/or error.

514,825
N85-13503/6/GAR PC **A09/MF A01**
Stuttgart Univ. (Germany, F.R.). Inst. fuer Kernenergetik und Energiesysteme.
Entwurf und Implementierung Eines Modularen Programmsystems Zur Durchfuehrung Statistischer Analysen (Design and Implementation of a Modular Program System for Statistical Analyses).
Ph.D. Thesis.
W. Beck. Jan 84, 200p IKE-4-114
In German, English Summary.

A modular program system STAR was designed and implemented for statistical methods. STAR is a component of the program system RSYST. The statistical methods, which are based on the Monte Carlo method, are used for the solution of scientific and technical problems. The design of STAR considers: users with different knowledge of data processing and statistics; the variety of statistical methods, generating and evaluating procedures; the processing of large data sets in complex structures; the coupling to other components of RSYST and RSYST foreign programs; and that the system can be easily modified and enlarged. Four examples are given which demonstrate the application of STAR. The most important computer programs are enclosed, together with some basic explanations.

514,826
N85-13504/4/GAR PC **A04/MF A01**
Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt e.V., Brunswick (Germany, F.R.).
Formats for Numerical and Textual Data in Data Processing.
G. Roseneau. Dec 83, 69p DFVLR-MITT-84-07
In German; English Summary.

The representation of numerical values and texts in data processing is discussed. A distinction is made between external formats for visually readable representations and direct formats which use the elements of the representation inside the computer. Examples are given to explain the two format types for numerical values.

514,827
N85-13514/3/GAR PC **A02/MF A01**
National Aeronautics and Space Administration, Edwards, CA. Hugh L. Dryden Flight Research Center.
Test Experience on an Ultrareliable Computer Communication Network.
L. W. Abbott. Dec 84, 8p NAS 1.15:85915, H-1268, NASA-TM-85915
Prepared in Cooperation with NASA. Ames Research Center. Presented at the Aiaa/IEEE 6TH Digital Avionics Conf., Baltimore, 3-6 Dec. 1984.

The dispersed sensor processing mesh (DSPM) is an experimental, ultra-reliable, fault-tolerant computer communications network that exhibits an organic-like ability to regenerate itself after suffering damage. The regeneration is accomplished by two routines - grow and repair. This paper discusses the DSPM concept for achieving fault tolerance and provides a brief description of the mechanization of both the experiment and the six-node experimental network. The main topic of this paper is the system performance of the growth algorithm contained in the grow routine. The characteristics imbued to DSPM by the growth algorithm are also discussed. Data from an experimental DSPM network and software simulation of larger DSPM-type networks are used to examine the inherent limitation on growth time by the growth algorithm and the relationship of growth time to network size and topology.

514,828
N85-13516/8/GAR PC **A08/MF A01**
Martin Marietta Aerospace, Denver, CO. Denver Div.

Evaluation of Automated Decisionmaking Methodologies and Development of an Integrated Robotic System Simulation.
D. C. Haley, B. J. Almand, M. M. Thomas, L. D. Krauze, and K. D. Gremban. Sep 84, 172p NAS 1.26:172401, MCR-84-549, NASA-CR-172401
Contract NAS1-16759

A generic computer simulation for manipulator systems (ROBSIM) was implemented and the specific technologies necessary to increase the role of automation in various missions were developed. The specific items developed are: (1) capability for definition of a manipulator system consisting of multiple arms, load objects, and an environment; (2) capability for kinematic analysis, requirements analysis, and response simulation of manipulator motion; (3) postprocessing options such as graphic replay of simulated motion and manipulator parameter plotting; (4) investigation and simulation of various control methods including manual force/torque and active compliances control; (5) evaluation and implementation of three obstacle avoidance methods; (6) video simulation and edge detection; and (7) software simulation validation.

514,829
N85-13526/7/GAR PC **A02/MF A01**
Wisconsin Univ.-Madison.
Noise Removal in Multichannel Images.
C. L. Yeh, and R. T. Chin. 1983, 7p NAS 1.26:174116, NASA-CR-174116
Contract NAGW-380

An adaptive filtering method, the Windrow-Hoff algorithm, for enhancing multichannel signals against additive noise was investigated. It removes noise for multichannel images containing correlated signal components but uncorrelated noise components. Its potential application is the enhancement of multichannel microwave satellite images as a preprocessing step for the extraction of geophysical parameters.

514,830
N85-13527/5/GAR PC **A03/MF A01**
Wisconsin Univ.-Madison.
Restoration of Multichannel Microwave Radiometric Images.
R. T. Chin, C. L. Yeh, and W. S. Olson. 1983, 28p NAS 1.26:174115, NASA-CR-174115
Contract NAGW-380
Submitted for Publication. Presented at the Computer Vision and Pattern Recognition Conf., Arlington, VA., 19-23 Jun. 1983.

A constrained iterative image restoration method is applied to multichannel diffraction-limited imagery. This method is based on the Gerchberg-Papoulis algorithm utilizing incomplete information and partial constraints. The procedure is described using the orthogonal projection operators which project onto two prescribed subspaces iteratively. Some of its properties and limitations are also presented. The selection of appropriate constraints was emphasized in a practical application. Multichannel microwave images, each having different spatial resolution, were restored to a common highest resolution to demonstrate the effectiveness of the method. Both noise-free and noisy images were used in this investigation.

514,831
PB85-138337/GAR PC **E03/MF E03**
National Physical Lab., Teddington (England). Div. of Information Technology and Computing.
Digital Signatures - An Update,
D. W. Davies, and W. L. Price. c1984, 11p NPL-DITC-51/84

This paper is a continuation of the one presented by the authors at ICCC80, Atlanta. It considers developments in methods for efficient generation of digital signatures on documents and messages. RSA signature is considerably facilitated by calculating a hash function of the message; then the result of the function is signed, rather than the message. Choice of a suitable function requires care; it is shown that some previously suggested hash functions are weak in reality. A strong hash function is suggested. Finally a brief look is taken at the role of signatures in electronic funds transfer systems. (Copyright (c) Crown Copyright 1984.)

514,832
PB85-138345/GAR PC **E04/MF E04**
National Physical Lab., Teddington (England). Div. of Information Technology and Computing.
Some Experiences of Testing Protocol Implementations,
J. R. Pavel, and D. J. Dwyer. c1984, 27p NPL-DITC-48/84

After providing a brief introduction to Open Systems Interconnection, protocols, and protocol test methods, the report relates some experiences of protocol testing with a variety of testing tools. Common shortcomings in protocol implementations and difficulties with current testing systems are outlined. Finally, a testing system which takes these experiences into account is proposed. (Copyright (c) Crown Copyright 1984.)

514,833
PB85-139780/GAR PC **E04/MF E04**
Newcastle upon Tyne Univ. (England). Computing Lab.
Reliable Stable Storage System for UNIX (Trade Name).
Technical rept. series,
J. A. Anyanwu. c1984, 27p TRS-191

This paper describes the implementation of a stable storage system which converts several fallible disk stores into a reliable device for storing data. It provides reliable reading and writing of data in a distributed UNIX environment in spite of transient I/O faults, decay of physical storage devices and processor crashes. The implementation makes available to UNIX users a convenient way of using the facilities of a stable storage system by providing the abstraction of stable files and by maintaining the standard UNIX system call interface. It systematically handles abnormal situations by separating normal and exceptional processing in both the system description and implementation. This is achieved through the use of a fault tolerance design notation for the description of the system and the implementation of that notation using an exception handling package. (Copyright (c) 1984, University of Newcastle upon Tyne.)

514,834
PB85-139798/GAR PC **E03/MF E03**
Newcastle upon Tyne Univ. (England). Computing Lab.
Communication System Supporting Large Datagrams on a Local Area Network.
Technial rept. series,
A. Linton, and F. Panzieri. c1984, 20p TRS-193

This paper describes an implementation of a software interface designed for use from within UNIX application programs for network communications. This interface provides the abstraction of possibly very large datagrams, supports 'scatter-gather' facilities, and maintains standard network addresses consisting of (host number; port number) pairs. This interface has been provided on different data communication facilities allowing uniform program access to those facilities. The particular implementation developed for a local area network is described and performance results obtained are examined and compared with those obtained from a conventional datagram interface to that network. The results obtained confirm that the abstraction of very large datagrams enables the construction of an efficient mechanism for process-to-process communications over the network that is not only more convenient, but also has significant performance advantages over the use of conventional (small) datagrams. (Copyright (c) 1984, University of Newcastle upon Tyne.)

514,835
PB85-140564/GAR PC **E04/MF E04**
Newcastle upon Tyne Univ. (England). Computing Lab.
Communications Protocols for Local Area Networks.
Technical rept. series,
F. Panzieri. c1984, 65p TRS-192

The communication software architectures and the communication protocols implemented on the Cambridge Ring on the Ethernet local area networks are discussed. Also, an introduction is provided to the communications architecture proposed by the IEEE Computer Society as a standard for various local area networks, including ring networks such as the IBM Token Ring and Bus networks such as Ethernet. A final section shows the communications architecture supporting UNIX United Systems can conveniently interface conventional UNIX systems to one or more data communication networks to provide a fully distributed UNIX system. (Copyright (c) 1984, University of Newcastle upon Tyne.)

514,836
PB85-140846/GAR PC **E03/MF E03**
Kent Univ., Canterbury (England). Computing Lab.
I-PIGS: A Concurrent Programming Environment with Interactive Graphical Support,
M. C. Pong. c1984, 11p UKC COMPUTING LAB-26

This paper describes the programming environment I-PIGS which makes use of interactive graphics to support concurrent programming. I-PIGS uses two important graphical forms in the representation of a concurrent program: special structured chart forms for control constructs in a sequential process, and graphical form of interconnection between communicating processes. The graphical representations are clearer than pure textual representation. They become part of the syntax of the supported language Pigsty. The interactive graphical editor of I-PIGS ensures that the interconnection patterns between the processes are 'syntactically' correct. Pigsty uses improved CSP facilities for communication and synchronization between the processes. Concurrent execution of the processes is simulated by time-sharing the CPU. This allows a simple way to detect dead-lock during simulated runs. An important feature of I-PIGS is that the control flow and data flow of the communicating processes are animated on the screen during execution. The control flow is animated by highlighting the process and the construct currently being executed. The data flow between communicating processes is shown by highlighting the graphical representation of the process waiting to send or receive data; and if data can really be transmitted, the data value is animated as sending from one process to the other. These help the user to understand the interaction between the processes more easily and more clearly. Thus, I-PIGS uses interactive graphics effectively to support the development and debugging of concurrent programs. (Copyright (c) 1984, University of Kent at Canterbury.)

514,837
PB85-140861/GAR PC **E03/MF E03**
Norges Tekniske Hoegskole, Trondheim. Verkstedteknisk Lab.
Basis for a Geometric Modeller,
S. Fjeldaas. Jun 84, 18p STF17-A84042
Also pub. as Norges Tekniske Hoegskole, Trondheim. Selskapet for Industriell og Teknisk Forskning rept. no. STF17-A84042.

The report is a preprint of a paper to be presented at the SMSSH'84, Scientific and Methodological Seminar on Ship Hydrodynamics, in Varna, Bulgaria, in October 1984. It contains a discussion on data structures and operations on data structures suitable for geometric modelling. Geometric modellers are normally thought of as a basis of computer aided design, supporting engineering drawing activities. Direct applications of geometric modellers in computer aided manufacturing are few, possibly because the available software has some inherent limitations. New ideas have been developed and tested by an experimental modeller. It seems suitable to support CAD as well as CAM activities. The modeller is based on a combination of well recognized ideas for analytic geometry and new ideas inspired by electric networks and set theory for the topology. The paper discusses the applications of the ideas and their influence on the capability of the modeller.

514,838
PB85-144178/GAR PC **A04/MF A01**
General Accounting Office, Washington, DC. Information Management and Technology Div.
Better Management of Information Resources at the Bureau of Indian Affairs Could Reduce Waste and Improve Productivity.
21 Dec 84, 68p GAO/IMTEC-85-1, B-209876

The Department of the Interior's Bureau of Indian Affairs has not effectively managed its automatic data processing equipment (ADP), systems development projects, and forms. GAO found equipment being underused or not being used at all, systems development efforts that duplicated or overlapped one another, and unapproved forms being used to collect information. In an effort to impose tighter controls, the Congress cut the Bureau's ADP funds for fiscal year 1984 by $8.4 million--from $11.4 million to $3 million--and directed the Bureau to take several corrective actions. Interior has initiated actions to strengthen the Bureau's management of information resources, but additional actions are needed to resolve identified problems. For example, Interior created an office to deal with the Bureau's ADP problems, but this office has not been staffed and its charter does not cover significant aspects of information resources management, such as

overseeing the use of funds to develop software for Bureau computers.

514,839
PB85-151769 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Report on the Status of the Development of the IEEE (Institute of Electrical and Electronics Engineers) Standard for Software Verification Plans (P1012).
Final rept.,
R. U. Fujii, D. R. Wallace, and M. Edwards. Oct 84, 8p
Pub. in Proceedings of Software Engineering Standards Application Workshop (3rd), San Francisco, CA., October 2-4, 1984, p100-107.

The proposed IEEE Standard for Software Verification Plans (SVP) will be a member of IEEE's software engineering family of standards. This paper represents an interim stage of the proposed SVP standard. The final form is scheduled for ballot by IEEE in 1985. It will provide the user with a format and content for software verification plans. It will establish a minimum set of verification tasks to be performed for critical software during each phase of the lifecycle. The SVP standard will also provide for optional verification tasks based upon individual program needs. The SVP standard will provide adequate guidance to ensure that the SVP provides for proper management checkpoints and audits, including written results of executing the SVP.

514,840
PB85-151801 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Language Independent Superstructure for Implementing Real-Time Control Systems.
Final rept.,
A. J. Barbera, M. L. Fitzgerald, J. S. Albus, and L. S. Haynes. 1984, 12p
Sponsored by Maryland Univ., College Park.
Pub. in Proceedings of Workshop on High-Level Computer Architecture, Los Angeles, CA., May 21-25, 1984, p7.28--7.39.

It is the purpose of the system superstructure described in this paper to create an environment that eases the user's development of software. Techniques and software tools are described that help organize a system into a very structured and modular framework that is conducive to interfacing, upgrading, partitioning onto multiple computer systems, and debugging. A system dictionary is described that, together with the modular superstructure, allows the creation of a highly interactive environment where single programs or any level of aggregation of programs can be executed and where any variable or aggregation of variables can be examined, traced, displayed, or modified.

514,841
PB85-854867/GAR PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Flexible Manufacturing Systems. 1975-February 1984 (Citations from the INSPEC: Information Services for the Physics and Engineering Communities Data Base).
Rept. for 1975-Feb 84.
Feb 85, 153p

This bibliography contains citations concerning theory, economics, and applications of flexible manufacturing systems. Fundamental principles, development assessment, manufacturing computer control, and robotization technology are discussed. Prospects, development trends, and product inspection techniques are considered. (This updated bibliography contains 225 citations, none of which are new entries to the previous edition.)

514,842
PB85-855039/GAR PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Optical Memory Data Storage. 1975-February 1985 (Citations from the INSPEC: Information Services for the Physics and Engineering Communities Data Base).
Rept. for 1975-Feb 85.
Feb 85, 109p
Supersedes PB84-860824.

This bibliography contains citations concerning technology, design, and capacity of optical memory systems. Optical data recording techniques including disc memories, holographic memories, pattern recognition systems, and image memories are considered. The use of optical filters, electrooptic materials, and ferroelectric crystals is also discussed. (This updated bibliography contains 127 citations, 15 of which are new entries to the previous edition.)

514,843
PB85-855260/GAR PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Semiconductor Random Access Memories: Integrated Circuit Testing and Reliability. 1975-February 1985 (Citations from the INSPEC: Information Services for the Physics and Engineering Communities Data Base).
Rept. for 1975-Feb 85.
Feb 85, 153p
Supersedes PB84-860485.

This bibliography contains citations concerning testing technology and reliability evaluation of semiconductor random access memory circuits. Topics include integrated circuit testing, circuit reliability, test strategy, and testing process. Logic, life, environmental, diagnostic, automatic, and electron beam testing are discussed. (This updated bibliography contains 195 citations, 76 of which are new entries to the previous edition.)

514,844
PB85-855294/GAR PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Semiconductor Random Access Memories: Integrated Circuit Design and Fabrication. 1975-February 1985 (Citations from the INSPEC: Information Services for the Physics and Engineering Communities Data Base).
Rept. for 1975-Feb 85.
Feb 85, 129p
Supersedes PB84-860493.

This bibliography contains citations concerning design and fabrication technology for semiconductor random access memory circuits. Automation systems, features, and performance of integrated circuit design are discussed. Lithography and etching techniques are presented. Fabrication facilities and processes are also considered. (This updated bibliography contains 156 citations, 26 of which are new entries to the previous edition.)

514,845
PB85-855344/GAR PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Microprocessors Used for Electric Motor Controls and Monitors. 1975-February 1985 (Citations from the INSPEC: Information Services for the Physics and Engineering Communities Data Base).
Rept. for 1975-Feb 85.
Feb 85, 211p
Supersedes PB84-862705.

This bibliography contains citations concerning the utilization of microprocessors for the control, function monitoring, and protection of electric motors. Alternating and direct current motors are included in both high and low power applications. Stepping motor control used in magnetic disc drives, robotics, and other positioning applications is also addressed. (This updated bibliography contains 272 citations, 52 of which are new entries to the previous edition.)

514,846
PB85-855377/GAR PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Firmware: Design Techniques and Applications. 1975-February 1985 (Citations from the INSPEC: Information Services for the Physics and Engineering Communities Data Base).
Rept. for 1975-Feb 85.
Feb 85, 216p
Supersedes PB84-860402.

This bibliography contains citations concerning design techniques and applications of computer firmware. Firmware construction techniques, testing, verification, and maintenance are discussed. Technological applications in direct digital control, process control, signal and image processing, microcomputers systems, and microprocessors systems are presented. (This updated bibliography contains 291 citations, 39 of which are new entries to the previous edition.)

514,847
PB85-855401/GAR PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Expert Computer Systems. February 1984-January 1985 (Citations from the INSPEC: Information Services for the Physics and Engineering Communities Data Base).
Rept. for Feb 84-Jan 85.
Feb 85, 283p
Supersedes PB84-877430.

This bibliography contains citations concerning the use of knowledge and reasoning techniques in computer programs designated as expert systems. Expert systems are a form of artificial intelligence, used to solve problems that often require human intervention to apply reasoning and experience. Applications include engineering design, medical diagnosis, management decision support systems, computer assisted instruction, structural analysis, and improvement in man-machine communications. (This updated bibliography contains 373 citations, 143 of which are new entries to the previous edition.)

9C. Electrical and Electronic Engineering

514,848
AD-A149 055/6/GAR PC **A02**/MF **A01**
Naval Research Lab., Washington, DC.
Flashover Failures from Wet-Wire Arcing and Tracking.
Annual rept. Oct 83-Sep 84,
F. J. Campbell. 17 Dec 84, 24p Rept no. NRL-MR-5508

Flashover failure occurs in a wire bundle as a high-energy surge between a bare conductor delivering power and a ground-plane (e.g. metal framework or wire shielding) as the conductive path across adjacent wires approaches zero resistance. It happens as a violent blazing flashover in which the copper of the bare wire melts and splatters - causing melting and burn-through of some of the adjacent wires in the bundle. Thus, it could produce the loss of a number of circuits at once. Under service stress conditions the process leading to a flashover could begin as the wire insulation initially deteriorates by cracking or chaffing and the surfaces of adjacent wires in the bundles become contaminated due to salt spray, mist, fog and high humidity. Under these conditions, typical of Naval aircraft service, arcing and tracking initiate and eventually localized spots extend into a continuous carbonaceous path, bridging the wires from the fault to ground. At some point the wetting is no longer necessary to sustain the current, and the flashover strikes. This phenomena is know to develop on the surfaces of polymeric materials that readily carbonize when pyrolized nad the susceptibility to fail by this mechanism is characterized in standard arcing and tracking tests. The phenyl-containing polymeric materials fall into this class. Laboratory tests have demonstrated that flashover will occur on wires insulated with a hi-phenyl polyimide composite and also on wires insulated with a polyphenyl ketone polymer; whereas, two types of a polytetrafluoroethylene insulation did not carbonize or flashover in the test. These results are in agreement with other references on arcing and tracking studies. (Author).

514,849
N85-13169/6/GAR PC **A05**/MF **A01**
Centre National d'Etudes Spatiales, Toulouse (France).
Les Composants Electronics pour Applications Spatiales (Electronic Components for Space Applications).
F. Linder. Sep 83, 78p CNES-NT-109
In French; English Summary.

Procedures to obtain high reliability components are described, including choice of component and manufacturer, quality level, procurement procedures, selection criteria, and fault analysis.

514,850
PB85-147899 Not available NTIS
National Bureau of Standards (NEL), Boulder, CO. Electromagnetic Fields Div.
Error Analysis of Radiation Characteristics of an Unknown Interference Source Based on Power Measurements.
Final rept.,
M. T. Ma. 1984, 6p
Pub. in Proceedings of the 1984 International Symposium on Electromagnetic Compatibility, Tokyo, Japan, October 16-18, 1984, p39-44.

Theoretical derivations for analyzing the uncertainties in the source parameters and radiation characteristics of an unknown electrically small interference source, extracted from the power measurements made inside a transverse electromagnetic (TEM) cell are given. Numerical examples with assumed unbiased and biased measurement errors, and for the worst case are also presented.

514,851
PB85-855153/GAR PC **N01/MF N01**
National Technical Information Service, Springfield, VA.
Built-In Test Equipment for Electronic Systems. 1975-January 1985 (Citations from the INSPEC: Information Services for the Physics and Engineering Communities Data Base).
Rept. for 1975-Jan 85.
Feb 85, 96p
Supersedes PB84-859802.

This bibliography contains citations concerning the design, testing, and evaluation of built-in test equipment. Applications include avionics, communication systems, missile systems, radar, and other electronic systems using large scale integrated circuits. Included in test and evaluation of this built-in automatic test equipment are fault isolation capabilities and analyses of false alarm rates. (This updated bibliography contains 116 citations, 33 of which are new entries to the previous edition.)

514,852
PB85-855187/GAR PC **N01/MF N01**
National Technical Information Service, Springfield, VA.
Stepper Motors. 1975-February 1984 (Citations from the INSPEC: Information Services for the Physics and Engineering Communities Data Base).
Rept. for 1975-Feb 84.
Feb 85, 243p

This bibliography contains citations concerning studies and reports on the design, performance, and applications of stepper or stepping motors of various types. Emphasis is placed on stepping motors for controlling a wide variety of instruments and equipment. Criteria is presented for the selection of stepper motors for specific applications. (This updated bibliography contains 350 citations, none of which are new entries to the previous edition.)

514,853
PB85-855195/GAR PC **N01/MF N01**
National Technical Information Service, Springfield, VA.
Stepper Motors. March 1984-February 1985 (Citations from the INSPEC: Information Services for the Physics and Engineering Communities Data Base).
Rept. for Mar 84-Feb 85.
Feb 85, 73p
Supersedes PB84-861004.

This bibliography contains citations concerning studies and reports on the design, performance, and applications of stepper or stepping motors of various types. Emphasis is placed on stepping motors for controlling a wide variety of instruments and equipment. Criteria is presented for the selection of stepper motors for specific applications. (This updated bibliography contains 84 citations, all of which are new entries to the previous edition.)

514,854
PB85-855351/GAR PC **N01/MF N01**
National Technical Information Service, Springfield, VA.
Electric Power Load Management. 1982-February 1985 (Citations from the NTIS Data Base).
Rept. for 1982-Feb 85.
Feb 85, 192p
Supersedes PB83-807073.

This bibliography contains citations concerning residential, commercial, and industrial load management. Load forecasting, the impact of alternative energy strategies, including dispersed storage and generation, off-peak power utilization, and cogeneration, and communication systems used in distributed control are among the topics presented. Capacity expansion analysis, the utilization of computer models in forecasting and system planning, and consumer attitudes regarding load control and rate structures are also discussed. (This updated bibliography contains 210 citations, 117 of which are new entries to the previous edition.)

9D. Information Theory

514,855
AD-A148 856/8/GAR PC **A05/MF A01**
Rhode Island Univ., Kingston. Dept. of Electrical Engineering.
Probability Density of Signal-to-Noise Ratio in an Improved Adaptive Detector. Part 1.
Final rept. 15 Apr 81-30 Sep 84,
I. Kirsteins, and D. W. Tufts. Oct 84, 81p
Contract N00014-81-K-0144

Document describes an approximate probability distribution for the SNR (signal-to-noise ratio) of an improved adaptive detector in near rank-1 gaussian noise where the filter weights are computed using the principal eigenvectors of the estimated noise covariance matrix. The noise consists of two components, a strong rank-1-covariance interference component plus white noise. Computer simulation is used to verify the approximating SNR distribution and show that it is accurate even for small sample size and low interference-to-noise ratios.

514,856
AD-A148 879/0/GAR MF **A01**
Rhode Island Univ., Kingston. Dept. of Electrical Engineering.
Methods of Computer-Aided Analysis of Non-Gaussian Noise and Application to Robust Adaptive Detection. Part 2.
Final rept. 15 Apr 81-30 Sep 84,
I. Kirsteins, and D. W. Tufts. Oct 84, 59p
Contract N00014-81-K-0144
Availability: Microfiche copies only.

We present a methodology for the modeling of certain non-stationary and non-gaussian random time series data with application to weak signal detection. Some components of the noise, which give it its nongaussian characteristics, can be individually modeled, synthesized and subtracted to provide a gaussian residual. Further, it is shown that this process can also be carried out when signals are present. The proposed methodology is applied to some Arctic Acoustic data using a combination of adaptive differential quantization and adaptive signal estimation algorithms based on singular-value-decomposition of a data matrix which we have developed. The combination of adaptive differential quantization with low-rank approximations to data matrices or estimated covariance matrices is believed to be a new and effective method for multivariable, robust, adaptive detection.

514,857
AD-A148 906/1/GAR PC **A02/MF A01**
Naval Research Lab., Washington, DC.
Ambiguity Function of Random Binary-Phase-Coded Waveforms,
C. Lin. 4 Dec 84, 13p Rept no. NRL-8856

The cross-correlation technique for signal detection and parameter estimation is widely used in communication and radar systems. For popular binary waveforms, the properties of their ambiguity functions have been studied for years. However, the results are generally restricted to specific codes which are either deterministic or pseudorandom. From the uncooperative reception viewpoint, without a priori knowledge of the emitted signal in many cases, the cross-correlating signals may be considered truly random. The report investigates the ambiguity function of truly random binary-phase-coded waveforms as an approximation to those waveforms commonly employed in binary-modulated pseudorandom systems/encoded radar systems. Here, in a statistical sense, the ambiguity function of a truly random binary-phase-coded waveform is analytically derived in which the normally used deterministic cross-correlation process is replaced by its ensemble average. Various doppler responses are presented and discussed. The results are compared with those obtained by transmitting an aperiodic maximum-length pseudorandom sequence. It is shown that the ambiguity function of the latter case is closely represented by the ensemble-average response of the truly random binary signal of equal length. With the transmitted signal unknown to a cross-correlator, the characteristics of the ambiguity function derived here provides predictive characteristics useful for practical cross-correlator system design.

514,858
N85-13137/3/GAR PC **A02/MF A01**
Instituto de Pesquisas Espaciais, Sao Paulo (Brazil).
Limitantes DA Equivocacao Em Canais Gaussianos Aditivos (Equivocation Limits in Gaussian Additive Channels).
M. H. M. Costa. Jul 83, 12p INPE-2828-PRE/380
Text in Portugese. Presented at the 1ST Simp. Brasileiro de Telecomunicacoes, Rio de Janeiro, 5-9 Sep. 1983.

Equivocation in a Gaussian additive channel is defined as H(X/X + Z(subt)) or as the conditional entropy of X entry and X + Z (subt) exit of the channel. Equivocation is obviously a function of t power of additive Gaussian interference Z(subt). The upper and lower limits of equivocation as the function of interference power t are investigated. The lower limit passes the concavity of entropy power in the function of additional interference power. This limit has numerous uses in information theory: it permits establishment of the optimality of two extreme points of the general Gaussian interference channel. The upper limit is a consequence of the inequality of Shannon entropy power. This limit establishes the fact that the very rapid increase in equivocation is logarithmic.

514,859
N85-13167/0/GAR PC **A04/MF A01**
Centre National d'Etudes Spatiales, Toulouse (France).
Simulation d'Une Chaine de Transmission a Elements Faiblement Non Lineaires. Calcule des Produits d'Intermodulation sur UN Signal Compose de N Porteuses (Simulation of a Transmission Circuit Composed of Slightly Nonlinear Elements. Computation of the Intermodulation on Signals Composed of N Carriers).
J. L. Sedard, and L. Lapierre. Oct 82, 51p CNES-NT-105
In French; English Summary.

The effects associated with component nonlinearity in a circuit composed of filters, amplifiers and mixers are characterized. A computer program for the computation of the third order intermodulation products, the signal compression, and the corresponding C/I ratio of a multicarrier input signal is described. These nonlinearities are determined by the third order intercept point and gain (or conversion loss).

514,860
N85-13535/8/GAR PC **A02/MF A01**
Illinois Inst. of Tech., Chicago.
Undetected Error Probability for Shortened Hamming Codes.
D. J. Costello, and S. Lin. 12 Dec 84, 16p NAS 1.26:174175, NASA-CR-174175
Contract NAG5-234

Hamming or shortened Hamming codes are widely used for error detection in data communications. For example, the CCITT (International Telegraph and Telephone Consultative Committee) recommendation X.25 for packet-switched data networks adopts a distance-4 cyclic Hamming code with 16 parity-check bits for error detection. The natural length of this code is n = 2(15)-1 = 32,767. In practice the length of a data packet is no more than a few thousand bits which is much shorter than the natural length of the code. Consequently, a shortened version of the code is used. Often the length of a data packet varies, say from a few hundred bits to a few thousand bits, hence the code must be shortened by various degrees. Shortening affects the performance of the code. The error-de-

tection performance of shortened Hamming codes, particularly the codes obtained from the distance-4 Hamming codes adopted by CCITT recommendation X.25, is investigated. A method for computing the probability of an undetected error is presented.

9E. Subsystems

514,861
AD-A148 940/0/GAR PC **A02/MF A01**
Rome Air Development Center, Hanscom AFB, MA. Deputy for Electronic Technology.
Nulling at Symmetric Pattern Location with Phase-Only Weight Control,
R. A. Shore. May 84, 5p Rept no. RADC/ETR-84-0013
Pub. in IEEE Transactions on Antennas and Propagation, vAP-32 n5 p530-533 May 84.

No abstract available.

514,862
AD-A148 976/4/GAR PC **A02/MF A01**
Rome Air Development Center, Hanscom AFB, MA. Deputy for Electronic Technology.
Proof of the Odd-Symmetry of the Phases for Minimum Weight Perturbation Phase-Only Null Synthesis,
R. A. Shore. May 84, 4p Rept no. RADC/ETR-84-0014
Pub. in IEEE Transactions on Antennas and Propagation, vAP-32 n5 p528-530 May 84.

No abstract available.

514,863
AD-A149 002/8/GAR PC **A08/MF A01**
Aberdeen Proving Ground, MD. Materiel Testing Directorate.
General Purpose Signal Conditioning.
Final rept. 1 May 83-1 May 84,
S. F. Harley, and T. G. Shrader. Jun 84, 163p Rept no. APG-MT-6028

Road shock and vibration, vehicle performance, and fire control system testing requires the use of on-board signal conditioning. The General Purpose Signal Conditioning System (GPSCS) allows a mix and match approach as its 32 channels can be made up of interchangeable quad differential amplifiers, quad bridge conditioners, and quad charge amplifiers. Built into the system is a microprocessor based system controller that, through a microterminal, allows the operator to control calibration signal injection (precision AC, precision DC, and shunt resistance calibration) and selectively monitor the output of any of the channels and display either the average or rms value of those signals. The system operates over a temperature range of -25 C to +85 C and under conditions of shock and vibration of at least 1 g rms and 4.2 g's peak. The system requires approximately 3A at 28 VDC.

514,864
N85-13170/4/GAR PC **A03/MF A01**
Allgemeine Elektricitaets-Gesellschaft AEG Telefunken, Wedel (Germany, F.R.).
Qualification of a Thick Film Hybrid.
Final Report, Nov. 1980.
H. D. Stolp. Jun 84, 27p BMFT-FB-W-84-024
In German; English Summary. Sponsored by Bundesministerium fuer Forschung und Technologie.

Space qualification of a complete family of hybrids for satellite power supplies is discussed. The space qualification for a thick film hybrid comparator stage with adjustable time delay was examined. The qualification allows to use this hybrid for satellite power supplies. Circuitry selection and qualification procedure are described.

514,865
PAT-APPL-6-679 970/GAR PC **A03/MF A01**
Department of the Army, Washington, DC.
Filter Reflection Image Guide Oscillator and Solid State Line Scanning Device.
Patent Application,
H. Jacobs. Filed 13 Sep 84, 30p AD-D011 440/5
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This document describes a filter reflection image guide oscillator and a solid state line scanning device. The device includes a brass metal heat sink base on which a dielectric waveguide is mounted. A resonant cavity is defined in the dielectric waveguide and an oscillator diode, Gunn or IMPATT, for example, is located in the resonant cavity. The resonant cavity is enclosed by a metal cover with a post which is made to extend into the resonant cavity to contact one electrode of the oscillator diode. The top surface of the waveguide includes a perturbation surface consisting of parallel and spaced metal stripes which are laterally positioned along the length of the waveguide. The spacing of the metal stripes defines the function performed by the device. By changing the bias voltage of the oscillator diode or with the addition of a varactor with a separate DC bias source, the frequency in the waveguide can be changed and thus line scanning or beam steering is made possible.

514,866
PAT-APPL-6-679 971/GAR PC **A02/MF A01**
Department of the Army, Washington, DC.
Image Line Voltage Controlled Oscillator with Replaceable Components.
Patent Application,
R. E. Horn. Filed 27 Dec 84, 17p AD-D011 436/3
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A millimeter wavelength oscillator combining a mechanically tunable solid state diode element provides a basic stable steady wave energy source with fine-tuning capabilities not possible with a resonating cavity oscillator alone, and with an apparatus structure which is light in weight, compact, mechanically sturdy, and with easily accessible and quickly replaceable component parts. (Author)

514,867
PAT-APPL-6-679 972/GAR PC **A02/MF A01**
Department of the Army, Washington, DC.
Coaxial Cavity Gunn Oscillator Using Probe Coupled Microstrip.
Patent Application,
R. E. Horn. Filed 27 Dec 84, 20p AD-D011 437/1
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A millimeter wave microstrip transmission line is coupled to a solid state mechanically tunable cylindrical resonating coaxial cavity millimeter-wave oscillator by means of a probe extending linearly from the microstrip through an access slot in the cylindrical cavity wall into the zone of optimum electric field strength in the oscillator cavity to effect the translation of a TEM wave from the resonating cavity to the microstrip line at optimum power transfer and without wave mode change. (Author)

514,868
PAT-APPL-6-679 974/GAR PC **A02/MF A01**
Department of the Army, Washington, DC.
Integrated Varactor Tuned Coaxial Gunn Oscillator for 60 GHz Operation.
Patent Application,
J. W. Boyle. Filed 27 Dec 84, 15p AD-D011 439/7
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

In general, the invention according to our concept comprehends a millimeter wave oscillator which comprises, in combination, a housing or base portion which is provided with a resonating cavity, a solid state mechanically tuneable element which is adjustably moveably disposed in the housing, conveniently by means of a threaded engagement in a brass collar or the like fitting secured to the housing, which tuneable element is capable of producing millimeter-wave energy output at a frequency corresponding to its position in the resonate cavity, and a solid state electronically tuneable element arranged and physically disposed concentrically with same. Position adjustment means are provided exterior of the housing and operably connect to the mechanically tuneable element. Mechanical means connect between the mechanically tuneable element and the exteriorly located position adjustment means, and an electrical bias source is provided for each of the tuneable elements.

514,869
PB85-854883/GAR PC **N01/MF N01**
National Technical Information Service, Springfield, VA.
Low Noise Amplifiers and Preamplifiers. 1975-February 1984 (Citations from the INSPEC: Information Services for the Physics and Engineering Communities Data Base).
Rept. for 1975-Feb 84.
Feb 85, 252p

This bibliography contains citations concerning the design, development, construction, characteristics, and performance of a variety of low noise amplifiers and associated circuits. Considerable attention is given to GaAs FET amplifiers and preamplifiers including circuit designs, physical temperatures, high-speed performance, and reliability. (This updated bibliography contains 335 citations, none of which are new entries to the previous edition.)

514,870
PB85-854891/GAR PC **N01/MF N01**
National Technical Information Service, Springfield, VA.
Low Noise Amplifiers and Preamplifiers. March 1984-February 1985 (Citations from the INSPEC: Information Services for the Physics and Engineering Communities Data Base).
Rept. for Mar 84-Feb 85.
Feb 85, 56p
Supersedes PB84-861210.

This bibliography contains citations concerning the design, development, construction, characteristics, and performance of a variety of low noise amplifiers and associated circuits. Considerable attention is given to GaAs FET amplifiers and preamplifiers including circuit designs, physical temperatures, high-speed performance, and reliability. (This updated bibliography contains 57 citations, all of which are new entries to the previous edition.)

514,871
PB85-854958/GAR PC **N01/MF N01**
National Technical Information Service, Springfield, VA.
Heat Dissipation for Printed Circuit and Printed Wiring Boards and Cards. 1975-February 1985 (Citations from the INSPEC: Information Services for the Physics and Engineering Communities Data Base).
Rept. for 1975-Feb 85.
Feb 85, 66p
Supersedes PB84-863273.

This bibliography contains citations concerning techniques, devices, and materials for dissipating heat from various types of printed circuit and printed wiring boards, cards, and assemblies. Thermal analyses of boards, cards, and assemblies include studies of performance, efficiency, and a wide variety of thermal properties and characteristics. (This updated bibliography contains 80 citations, 12 of which are new entries to the previous edition.)

514,872
PB85-855013/GAR PC **N01/MF N01**
National Technical Information Service, Springfield, VA.
Very Large Scale Integration: Computer Aided Layout and Design. April 1983-January 1985 (Citations from the INSPEC: Information Services for the Physics and Engineering Communities Data Base).
Rept. for Apr 83-Jan 85.
Feb 85, 280p
Supersedes PB84-858752.

This bibliography contains citations concerning computer aided layout and design of very large scale integration (VLSI) circuits. Included are algorithms and languages for layout and design procedures. The computer aids provide for architectural design, for entering and verifying or editing the VLSI circuits, and for topology developed for the architecture. Some citations reference color graphics to assist in differentiating among layers, and others discuss means of dealing with the architectural complexity, or techniques to minimize the complexity. (This updated bibliography contains 347 citations, 187 of which are new entries to the previous edition.)

514,873
PB85-855120/GAR PC **N01/MF N01**

National Technical Information Service, Springfield, VA.
Gallium Arsenide Field Effect Transistor Amplifiers. 1975-February 1985 (Citations from the INSPEC: Information Services for the Physics and Engineering Communities Data Base).
Rept. for 1975-Feb 85.
Feb 85, 133p
Supersedes PB84-861491.

This bibliography contains citations concerning development reviews, design aspects, and applications of gallium arsenide field effect transistor amplifiers (GASFET). Topics include equipment descriptions, operational efficiencies, and performance evaluations of a variety of microwave and radar systems. Citations pertaining specifically to MESFET devices are excluded. (This updated bibliography contains 170 citations, 27 of which are new entries to the previous edition.)

514,874
PB85-855146/GAR PC N01/MF N01
National Technical Information Service, Springfield, VA.
Printed Circuits: Computer Aided Layout and Design. 1975-January 1985 (Citations from the INSPEC: Information Services for the Physics and Engineering Communities Data Base).
Rept. for 1975-Jan 85.
Feb 85, 246p
Supersedes PB84-855071.

This bibliography contains citations concerning computer aided layout and design of printed circuits and circuit boards. Included are interactive systems, automatic routing, design verification techniques, artwork generation, and trends in design automation. Some citations are review articles on the technology and case histories of productivity improvement and cost effectiveness. (This updated bibliography contains 349 citations, 77 of which are new entries to the previous edition.)

10. ENERGY CONVERSION (NON-PROPULSIVE)

10A. Conversion Techniques

514,875
DE84009775/GAR PC A14/MF A01
Department of Energy, Washington, DC. Office of the Controller.
Congressional Budget Request, FY 1985. Volume 2. Energy Supply Research and Development; Nuclear Waste Fund.
Feb 84, 309p DOE/MA-0064/2-V.2
Portions are illegible in microfiche products.

Budget requests for fiscal year 1985 are tabulated for the following research areas: solar and other renewable energy; nuclear; and nuclear waste fund. Separate overviews are provided for each research area. (ERA citation 10:002444)

514,876
DE84013012/GAR PC A02
Solar Energy Research Inst., Golden, CO.
Observed Acoustic and Aeroelastic Spectral Responses of a MOD-2 Turbine Blade to Turbulence Excitation.
N. D. Kelley, H. E. McKenna, and E. W. Jacobs. Jun 84, 9p SERI/TP-214-2374, CONF-8405153-4
Contract AC02-83CH10093
Horizontal-axis wind turbine technology conference, Cleveland, OH, USA, 8 May 1984.
Paper copy only, copy does not permit microfiche production.

Early results from a recent experiment designed to directly evaluate the aeroacoustic/elastic spectral responses of a MOD-2 turbine blade to turbulence-induced unsteady blade loads are discussed. The experimental procedure consisted of flying a hot-film anemometer from a tethered balloon in the turbine in-flow and simultaneously measuring the fluctuating airload and aeroelastic response at two blade span stations (65% and 87% spans) using surface-mounted, subminiature pressure transducers and standard strain gage instrumentation. The radiated acoustic pressure field was measured with a triad of very-low-frequency microphones placed at ground level, 1.5 rotor diameters upwind of the disk. Initial transfer function estimates for acoustic radiation, blade normal forces, flapwise acceleration/displacement, and chord/flapwise moments are presented. (ERA citation 10:004600)

514,877
DE84013029/GAR PC A06/MF A01
Solar Energy Research Inst., Golden, CO.
Solar Thermal Technology. Annual Evaluation Report, Fiscal Year 1983.
Aug 84, 125p SERI/PR-253-2188
Contract AC02-83CH10093
Portions are illegible in microfiche products. Original copy available until stock is exhausted.

This report documents the accomplishments and progress of the US Department of Energy Solar Thermal Technology (STT) Program during FY 1983, covering the period from October 1, 1982 to September 30, 1983. The focus of the STT Program is research and development leading to the commercial readiness of three primary solar thermal concepts: the central receiver, parabolic dish, and parabolic trough. To a lesser extent, the hemispherical bowl and salt-gradient solar pond are also being studied. This development effort is complemented by numerous research and planning activities. The Executive Summary contains a brief description of each technology and highlights of the fiscal year's technical activities. The remaining sections detail FY 1983 accomplishments and include a bibliography, list of contacts, acronyms, and definition of terms relevant to solar thermal technology and the STT Program. (ERA citation 10:000403)

514,878
DE84014042/GAR PC A02/MF A01
Los Alamos National Lab., NM.
Market Study of International Needs for New Electric Generating Capacity.
R. E. Malenfant. 1984, 5p LA-UR-84-1948, CONF-841105-1
Contract W-7405-ENG-36
Joint meeting of the American Nuclear Society and the Atomic Industrial Forum, Washington, DC, USA, 11 Nov 1984.

A market study of international needs for new electric generating capacity by using simple extrapolation of population and energy consumption to the year 2000 finds that a worldwide requirement for new generating capacity of 1000 to 1300 GWe is needed. Data used are consistent with World Bank projections of dramatically greater rates of increase in both population and energy consumption in the lesser developed countries (LDCs) by comparison with the developed countries. As such, 400 to 450 GWe of the increase is attributable to those LDCs that can support annual capacity additions of 100 to 1000 MWe. Because subjective factors such as public acceptance and time-dependent political ties determine the fraction of capacity attributable to nuclear power, this market is impossible to predict. However, it is unlikely that the complete demand for new generating stations can be met with fossil energy alone, which implies either a market share for nuclear or a shortfall in capacity that would increase the disparity between the LDCs and developed countries. (ERA citation 10:002467)

514,879
DE84015809/GAR PC A02/MF A01
Argonne National Lab., IL.
Theoretical Analysis of Condensation in the Presence of Noncondensable Gases as Applied to Open Cycle OTEC Condensers.
C. B. Panchal, and K. J. Bell. 1984, 16p CONF-841201-12
Contract W-31-109-ENG-38
ASME winter annual meeting, New Orleans, LA, USA, 9 Dec 1984.
Portions are illegible in microfiche products.

A theoretical analysis was carried out for the open-cycle OTEC condenser. Interfacial temperature profiles, and gas concentrations in the axial direction were determined, and their effects on the rate of condensation studied. For the analysis, the vapor phase was modeled using diffusion equations for simultaneous heat- and mass-transfer processes, while the liquid phase was modeled using a falling film analysis. This analysis was then applied to a plate-fin condenser, and the effect of varying the fin density along the condenser lengths was investigated. General engineering aspects of heat-exchanger design are discussed for condensation of vapor mixtures in the presence of noncondensable gases. (ERA citation 10:002135)

514,880
DE84016037/GAR PC A07/MF A01
Magma Gulf/Technadril, Houston, TX.
Sweet Lake Geopressured-Geothermal Project, Magma Gulf-Technadril/DOE Amoco Fee. Volume II. Surface Installations Reservoir Testing. Annual Report, February 28, 1981-February 10, 1982.
K. S. Hoffman. 1984, 130p DOE/NV/10081-2
Contract AC08-80NV10081
Portions are illegible in microfiche products. Original copy available until stock is exhausted.

The Magma Gulf-Technadril/Department of Energy Amoco Fee No. 1 (production) and salt water disposal wells were drilled in the period from August, 1980 to February 1981. Surface facilities were designed and constructed during March-June 1981. Flow testing began in June 1981 and continued until February, 1982. The Miogypsinoides interval contains seven discrete sands in the test well. These sands have been numbered 1 to 7, beginning at the top of the sequence. Data from wireline logs and core samples suggested that the first zone to be perforated should be Sand 5. Because of its high porosity and permeability, Sand 5 was thought to contain almost 50% of the total hydraulic capacity of the well. Flow testing of Sand 5 was performed in three stages, each of which is fully described in this report. Phase I was designed as an initial clean-up flow and a reservoir confirmation test. Phase II consisted of the reservoir limit determination test and lasted 17 days. Boundaries were confirmed which suggest that the Sweet Lake reservoir is fairly narrow, with boundaries on three sides, but is open in one direction with no closure for at least 4-1/4 miles. These boundaries approximate the shape of the graben in which the test well was drilled, but may or may not be directly related to the major faults forming the graben. Phase III testing was planned to be a long-term test at commercial design rates. Although Sand 5 alone would not support such rates, long-term production was demonstrated. Additional research not supported by DOE funding was also performed during the period covered by this report. This research, consisting of mud logging, micropaleontology, organic geochemistry, core analysis, and rock mechanics, is summarized in this report. (ERA citation 10:002190)

514,881
DE84017213/GAR PC A03/MF A01
Oak Ridge National Lab., TN.
Energy-Related Risk in the United States in the Year 2020.
H. Inhaber, and S. King. 1984, 38p IAEA-SM-273/12, CONF-840422-1
Contract AC05-84OR21400
International symposium on risks and benefits of energy systems, Juelich, F.R. Germany, 9 Apr 1984. Portions are illegible in microfiche products.

To reduce risks in the future, an important aim of risk research, we have to know at least two types of quantities: (1) the risks associated with each form of energy (or conservation) that will be used in the future; and (2) the amount of each type of energy use at a specified time. This paper estimates energy-related risk for one country at one future point in time. Conservation as well as production risk is considered. Certain forms of conservation, such as sealing up houses to retain heat and coolness, also produce human risk in the excess concentration of radon daughters they generate. In order to estimate risk in the year 2020, a number of assumptions have to be made. One key assumption is that the entire energy production or conservation cycle, from mining raw materials to disposition of final wastes, is considered. Results may be divided into three groups. The highest group, in no particular order, is the added risk involved in the massive transfer from larger to smaller automobiles in the US; the coal cycle, with end-uses of both electricity and synthetic fuels; and increased risk from radon daughters in residences as they are increasingly sealed in the future. All three

sources have a maximum risk annually in 2020 of about 100 million man-days lost, with a minimum range somewhat lower. (ERA citation 10:002451)

514,882
DE84752110/GAR PC **A03**/MF **A01**
GKSS - Forschungszentrum Geesthacht G.m.b.H., Geesthacht-Tesperhude (Germany, F.R.)
Test Field Pellworm for Wind Turbines.
S. Fries, J. Bruegmann, G. Petersen, and H. T. Mengelkamp. 1983, 48p GKSS-83/E/42
In German.
U.S. Sales Only. Portions are illegible in microfiche products.

The wind energy converter BRUeMMER BW 120 S was tested at the GKSS test field Pellworm from August 1980 to November 1982. The manufacturer of the plant is: Hermann Bruemmer Windkraftanlagen KG, Muehlenstrasse 8, Helmarshausen, 3522 Bad Karlshafen. Qualitative as well as quantitative test results are described. Especially a definitive power curve was determined. By means of this curve the annual energy production for a site with a known annual mean of the wind speed can be calculated. (ERA citation 09:049736)

514,883
DE84770428/GAR PC **A02**/MF **A01**
Bundesstelle fuer Aussenhandelsinformation, Cologne (Germany, F.R.).
Iran - Energy Situation 1983.
Feb 84, 6p NP-4770428
In German.
U.S. Sales Only. Portions are illegible in microfiche products.

Despite the fact that Iran still has not published any official economic statistics, some figures are available after presentation of its 1st five-year plan concerning the energy carriers of mineral oil, natural gas, coal and electricity generation. By and large, the data in this report are based on estimates by Western observers. Detailed analyses cannot be undertaken. (ERA citation 09:037749)

514,884
DE84770470/GAR PC **A03**/MF **A01**
Bundesstelle fuer Aussenhandelsinformation, Cologne (Germany, F.R.).
CSSR - Energy Situation 1980/81.
Jun 82, 35p NP-4770470
In German.
U.S. Sales Only. Portions are illegible in microfiche products.

The energy situation of the CSSR is reviewed on the basis of some relevant data. Its energy policy is commented on, and developments in electric power generation are described as well as the trends observed for the various energy sources. Figures are given on external trade and on the balance of payments. (ERA citation 09:049950)

514,885
DE84770479/GAR PC **A05**/MF **A01**
Auswertungs- und Informationsdienst fuer Ernaehrung, Landwirtschaft und Forsten e.V., Bonn (Germany, F.R.).
Use of Energy in Agricultural Households.
1983, 77p CONF-821285-
In German.AID meeting on use of energy in agricultural households, Darmstadt, F.R. Germany, 6 Dec 1982.
U.S. Sales Only.

The program of a symposium in which the participants could actively work on the elaboration of concepts on "the use of energy in agricultural households" was divided into 3 sections. The introduction and information phase included statements on the energy situation and on the assessment of the market supply taking into account planning methods and data in the fields of space heating and hot water supply (empirical reports of the individual Federal Laender). This was followed by the working phase with the introduction into the team work and the team work itself having the aim to make the work of the female advisers on the spot more effectively. The evaluation phase contained the reports of the groups and the following discussions in the plenum together with the resultant conclusions and consequences for measures for the use of energy in agriculture. The treatment of the subjects has been backed up by comprehensive cards and charts. (ERA citation 10:000782)

514,886
DE84770487/GAR PC **A03**/MF **A01**
Bundesstelle fuer Aussenhandelsinformation, Cologne (Germany, F.R.).
Indonesia - Energy Situation 1982/83.
Mar 84, 32p NP-4770487
In German.
U.S. Sales Only. Portions are illegible in microfiche products.

The energy situation of Indonesia is reviewed on the basis of some relevant data. Its energy policy is commented on, and developments in electric power generation are described as well as the trends observed for the various energy sources. Figures are given on external trade and the balance of payments. (ERA citation 10:000726)

514,887
DE84770488/GAR PC **A02**/MF **A01**
Bundesstelle fuer Aussenhandelsinformation, Cologne (Germany, F.R.).
Nigeria - Energy Situation 1982/83.
Apr 84, 14p NP-4770488
In German.
U.S. Sales Only. Portions are illegible in microfiche products.

The energy situation of Nigeria is reviewed on the basis of some relevant data. Its energy policy is commented on, and developments in electric power generation are described as well as the trends observed for the various energy sources. Figures are given on external trade and the balance of payments. (ERA citation 10:000727)

514,888
DE84770493/GAR PC **A07**/MF **A01**
Technische Hochschule, Aachen (Germany, F.R.). Fakultaet fuer Maschinenwesen.
Rotational Sound Development in Axial Turbomachinery and the Propagation in the Connected Tubing.
Diss. (Dr.-Ing.),
A. Ghiladi. 30 Sep 81, 132p NP-4770493
In German.
U.S. Sales Only.

After a representation of the mathematical foundations of the sound generation and propagation, the influence of blade damages in axial turbomachinery on the rotational sound is demonstrated qualitatively. A method for the calculation of the rotational sound in a turbomachine stage and in the connected tubing is given and it can be shown that the ordinal numbers of the numerous modes of rotational sound are determined by the number of the vane ring blades interacting with the runner blades. The cutoff effect causes an exponential decrease of the modes propagating helically in the tubing if the signal frequency is smaller than the relevant cutoff frequency. For the experimental investigation of a single-stage axial turbine a measuring method is described for the modal analysis of the accoustic fields, which is based on the correlation of the microphone signal with a reference signal. In the turbine, the axial distance between vane ring and runner have been varied. By means of flow measurements, the transient runner blade forces and the subsequent rotational sound modes were evaluated and compared with the acoustic measurements. Measures for an effective reduction of the rotational sound are discussed. (ERA citation 10:000864)

514,889
DE84770506/GAR PC **A08**/MF **A01**
Montanuniversitaet Leoben (Austria).
Energy Raw Materials in the Alps-Adria Region.
Feb 82, 172p CONF-8010366-
In German.Symposium on energy raw materials in the Alps-Adria region, Leoban, Austria, 13 Oct 1980.
U.S. Sales Only. Portions are illegible in microfiche products.

The common concerns of the republics, lands and regions that have joined to form the "Arbeitsgemeinschaft der Laender und Regionen der Ostalpengebiete" include the exchange of ideas and deliberation on all questions regarding energy supply, energy production and energy exchange. This brochure is the result of a symposium on "Energy raw materials in the Alps-Adria region". Scientists and representatives of the energy economy from Yugoslavia, Italy, the Federal Republic of Germany and Austria attended the symposium. It proceeded from a number of already fairly concrete problem definitions: adequate assessment of energy sources available in the Alps-Adria region, especially the use of the approved raw material coal under new technological conditions, the technical possibilities for using thermic energy and, above all, the benefit and possible uses of alternative energy sources. The interrelation between energy production and environment certainly belongs to the most important and momentous aspects to the energy economy, because it is this interrelation from which the modelling of tolerable conditions of life for man essentially depends. (ERA citation 10:000739)

514,890
DE84770508/GAR PC **A02**/MF **A01**
Bundesstelle fuer Aussenhandelsinformation, Cologne (Germany, F.R.).
Syria - Energy Situation 1982.
Apr 84, 13p NP-4770508
In German.
U.S. Sales Only. Portions are illegible in microfiche products.

An overall concept of energy policy for Syria is not known; data regarding the consumption of primary energy are not compiled. A report on the country's energy situation is therefore bound to cover mainly specific sectors (petroleum, natural gas, electric power). The relative data are presented in this report. (ERA citation 10:000728)

514,891
DE84770509/GAR PC **A02**/MF **A01**
Bundesamt fuer Energiewirtschaft, Bern (Switzerland).
Survey of Energy Consumption in Switzerland in 1983.
25 Apr 84, 7p NP-4770509
In German and French.
U.S. Sales Only. Portions are illegible in microfiche products.

The publication consists merely of tables which by way of extract, have been taken from the Swiss overall energy statistics 1983. (ERA citation 10:000774)

514,892
DE84770514/GAR PC **A03**/MF **A01**
Cologne Univ. (Germany, F.R.). Energiewirtschaftliches Inst.
Progress Report for the Period 1st January Until 31st December 1983.
1983, 32p NP-4770514
In German.
U.S. Sales Only.

The report gives a survey of the following topics: staff, teaching, meetings, publications, lectures, studies, consultancy services and contacts and presents brief reports on selected doctoral and diploma theses of the Institute. (ERA citation 10:000858)

514,893
DE85000037/GAR PC **A02**/MF **A01**
Tennessee Valley Authority, Chattanooga. Div. of Conservation and Energy Management.
Tightening Your Home for Energy Efficiency.
1984, 8p TVA/OP/CEM-84/75
Contract W-7405-ENG-48

An explanation of how weatherization affects air exchange is given to aid in an understanding of why pollutants build up. Some of the more common indoor air pollutants, their sources and ways to control these pollutants are identified. Several warning signs to assist in identifying the possible presence of high levels of air pollutants in the home are presented. (ERA citation 10:002526)

514,894
DE85000067/GAR PC **A02**/MF **A01**
Argonne National Lab., IL.
Achieving Aggressive Mitigation Through State Regulation: A Case of the Wyoming Industrial Development Information and Siting Act.
G. Williams. 1984, 6p CONF-8408112-1
Contract W-31-109-ENG-38
Rural Sociological Society meeting on issues in social impact analysis: natural resource agencies, College Station, TX, USA, 22 Aug 1984.

This paper addresses mitigation in a state which has an aggressive industrial siting act controlling the development of large, primarily energy-related industries in

the state. The state of Wyoming had the dubious distinction of hosting two of the most notorious modern day boom towns, Gillette and Rock Springs. These towns represented a host of problems that could be expected with energy development in other towns. It was in the context of rapid energy development with two prime examples of the negative impacts of rapid development on communities that Wyoming passed the Industrial Development Information and Siting Act of 1975. This act has become the backbone of Wyoming's aggressive approach to socioeconomic mitigation. 6 references. (ERA citation 10:002430)

514,895
DE85000186/GAR PC **A08**/MF **A01**
Bechtel Group, Inc., San Francisco, CA.
Environmental Assessment of Industrial Process Energy Conservation Measures. Final Report.
Sep 84, 175p DOE/BP-277
Contract AC79-83BP39209
Portions are illegible in microfiche products. Original copy available until stock is exhausted.

Bechtel Group Inc., under contract to Bonneville Power Administration, performed an environmental assessment of thirteen industrial process energy conservation measures (IPECMs). As specified, one or more measures defined in a previous BPA study by Syngeric Resources Corporation were applied to six industries. Bechtel's analysis is intended for BPA use in developing industrial energy conservation programs and supporting the environmental documentation necessary to comply with the National Environmental Policy Act. The industries and IPECMs studied were: frozen fruits and potatoes, sawmills and planning mills, Kraft pulp and paper, chlor-alkali, hydraulic cement, and aircraft. The IPECMs studied would have little or no effect on the overall plant emissions, discharges, or waste generation, except for those processes where wastes are burned. The reason for this is that the IPECMs reviewed do not involve major process changes, but are minor modifications or additions to supplemental processes. Several IPECMs were found to have minor effects on specific process streams. However, the environmental effects of these process changes are usually plant specific. The effects of IPECMs on indoor air quality and worker health and safety are also minor. The IPECMs evaluated had little effect on the environment, the workplace, or the worker. However, general safety and training programs may need to be enhanced as the result of an IPECM because of equipment additions or modifications. 15 references, 17 figures, 24 tables. (ERA citation 10:003370)

514,896
DE85000192/GAR PC **A03**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Sol-Gel-Derived AR Coatings for Solar Receivers.
C. S. Ashley, and S. T. Reed. Sep 84, 29p SAND-84-0662
Contract AC04-76DP00789
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This report details a process for applying sol-gel antireflection (AR) coatings to solar receiver envelopes. The process consists of applying a porous film which is subsequently etched to achieve the optimum AR effect. The result is a single-layer interference film with a reflectance minimum at 550 nm. The solar transmittance of coated tubes is typically increased to 0.95 to 0.97, as compared with 0.91 for uncoated tubes. Coated tubes showed no significant decrease in solar transmittance after 16 weeks of operation in a parabolic trough collector system. Recommendations are included for process improvement before industrial scale-up. (ERA citation 10:000438)

514,897
DE85000486/GAR PC **A02**/MF **A01**
Harris (Louis) and Associates, Inc., New York.
Pacific Northwest Residential Energy Survey, Spring 1983.
1983, 13p DOE/BP-330
Contract AC79-83BP39950
Portions are illegible in microfiche products.

This booklet is the mail survey instrument used by Bonneville Power Administration. (ERA citation 10:000848)

514,898
DE85000490/GAR PC **A04**/MF **A01**
Harris (Louis) and Associates, Inc., New York.
Pacific Northwest Residential Energy Consumption Survey, Spring 1983. Exhibit Booklet.
1983, 51p DOE/BP-327
Contract AC79-83BP39950

This booklet consists of the exhibits for the slide presentation used in the survey training session. (ERA citation 10:000846)

514,899
DE85000496/GAR PC **A05**/MF **A01**
Idaho Univ., Moscow. Dept. of Chemical Engineering.
Optimization of Design and Control Strategies for Geothermal Space Heating Systems. Final Report.
J. A. Batdorf, and G. M. Simmons. Jul 84, 96p DOE/ID/12167-T2
Contract AS07-80ID12167
Portions are illegible in microfiche products. Original copy available until stock is exhausted.

The efficient design and operation of geothermal space heating systems requires careful analysis and departure from normal design practices. Since geothermal source temperatures are much lower than either fossil fuel or electrical source temperatures, the temperature of the delivered energy becomes more critical. Also, since the geothermal water is rejected after heat exchange, it is necessary to extract all of the energy that is practical in one pass; there is no second change for energy recovery. The present work examines several heating system configurations and describes the desired design and control characteristics for operation on geothermal sources. Specific design methods are outlined as well as several generalized guidelines that should significantly improve the operation of any geothermally heated system. (ERA citation 10:002197)

514,900
DE85000630/GAR PC **A03**/MF **A01**
Bonneville Power Administration, Portland, OR.
Record of Decision: The Expanded Residential Weatherization Program.
1984, 28p DOE/NBM-5000630

The Administrator of the Bonneville Power Administration has decided to expand the present BPA Residential Weatherization Program to make house tightening measures - storm windows, other window treatments conserving energy, wall insulation, weatherstripping, caulking, and door treatments such as thermal pane replacements - available to all electrically heated homes in the BPA service area otherwise eligible for the program, and to adopt mitigation strategies to lessen the risk of adverse human health effects. The mitigation strategies include: (1) giving program participants (residents) information on indoor air pollutant sources and practical steps for reducing concentrations; (2) giving program participants options for having their homes monitored for radon concentrations; and (3) partially subsidizing the installation of a proven mitigation device, if radon concentrations exceed 5 pico-Curies per liter, the action level selected by BPA. (ERA citation 10:000791)

514,901
DE85000646/GAR PC **A03**/MF **A01**
Tennessee Univ., Knoxville. Energy, Environment and Resources Center.
Energy Management: Theory and Practice. Final Report.
R. A. Bohm, J. H. Gibbons, H. W. Henry, J. R. Moore, and W. T. Snyder. Nov 83, 46p DOE/CS/40069-T1
Contract AS05-76CS40069

Purpose of this project was to develop an MBA-level course in Energy Management at the University of Tennessee, and to develop educational materials for energy management. The course BA 5810 was timely and informative, with both students and the nation benefiting. A marketing plan for the educational materials developed is included. (ERA citation 10:002448)

514,902
DE85000666/GAR PC **A02**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Mini-Modal Testing of Wind Turbines Using Novel Excitation.
J. P. Lauffer, T. G. Carne, and A. R. Nord. 1984, 8p SAND-84-0984C, CONF-840178-1
Contract AC04-76DP00789
International modal analysis conference, Orlando, FL, USA, 26 Jan 1984.

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Modal testing of wind turbines can be fairly difficult because placing transducers on tall structures and providing low frequency excitation create problems. Moderate-size turbines are 100 to 200 feet tall, and their modal frequencies are very low, 0.1 to 5.0 Hz. In the mini-modal concept, only a limited number of response measurements are used in conjunction with a reasonably accurate finite element model to determine the modal parameters. Several techniques of low frequency excitation were explored, including impact, wind, step-relaxation, and human input. In tests using the mini-modal concept with human excitation, modal frequencies of large turbines have been determined in less than one day. As one application of these techniques, a prototype turbine was tested and two modal frequencies were found to be very close to integral multiples of the operating speed, which would cause a resonant condition. The design was modified to shift these frequencies, and the turbine was retested to confirm the expected changes in the modal frequencies. (ERA citation 10:002202)

514,903
DE85000874/GAR PC **A20**/MF **A01**
Foster Wheeler Solar Development Corp., Livington, NJ.
Molten Salt Solar Receiver Subsystem Research Experiment. Phase 1, Final Report. Volume 1. Executive Summary. Volume 2. Technical.
G. Carli. Oct 84, 466p SAND-82-8180
Contracts AC04-76DP00789, AC04-76DR00789
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This report presents the results of the work done in Phase 1 of a Department of Energy (DOE)-funded project for developing a cost-effective molten salt Receiver Subsystem (RS) for a commercial-size Solar Central Receiver System (SCRS) and providing the commercial fabrication process development for molten salt receivers. The report comprises three volumes. Volume 1, the Executive Summary, presents an overview of the study, including major results and conclusions along with a concise description of the RS. Volume 2 presents the discussions, evaluations, and results of work done during Tasks 1 through 7. Volume 3 contains Appendices A through T - detailed analyses and supporting information. (ERA citation 10:002129)

514,904
DE85001486/GAR PC **A04**/MF **A01**
Georgia Power Co., Atlanta.
Solar Total Energy Project, Shenandoah, Georgia Site. Annual Technical Progress Report, July 1, 1983-June 30, 1984.
E. J. Ney. Oct 84, 51p ALO-3994-84/1
Contract FC04-77ET20216

The Solar Total Energy Project (STEP) at Shenandoah, Georgia, is a cooperative effort between the United States Department of Energy (DOE) and the Georgia Power Company to further the search for new sources of energy. A part of the National Solar Thermal Energy Program, initially funded by DOE, the Shenandoah Project, is the world's largest industrial application of the solar total energy concept. The objective of the Project is to evaluate a solar total energy system that provides electrical power, process steam, and air conditioning for a knit-wear factory (operated by Bleyle of America, Inc.). During normal operation, solar energy generates a large part of the electricity and displaces part of the fossil fuels normally used to run the factory and produce the clothing. Construction of the system was completed early in 1982, when operations were initiated. Solution of unexpected electrical and mechanical problems produced significant information for subsequent system designs. A discussion of various anomalies, together with subsequent high quality solar and thermodynamic system performance results, is included. (ERA citation 10:002127)

514,905
DE85001730/GAR PC **A07**/MF **A01**
Federal Energy Regulatory Commission, Washington, DC. Office of Hydropower Licensing.
Water Resources Appraisal for Hydroelectric Licensing: Middle San Joaquin Valley Basin, Fresno, Madera, Mariposa, and Merced Counties, California.
Sep 84, 140p DOE/NBM-5001730
Portions are illegible in microfiche products.

The basin is described and an annotated listing of prior reports is presented. The following are discussed: the economy of the area, existing water and related land resources development, potential hydropower development, economic and human needs for further development of water and related land resources, and plans for future development. 44 references, 70 figures, 26 tables. (ERA citation 09:049594)

514,906
DE85001846/GAR PC **A03**/MF **A01**
United Nations Inst. for Training and Research, New York.
Important for the Future. Volume VI, Nos. 2-3. Special Issue on the Conference on Small Energy Resources.
J. Barnea, M. Bloome, and M. Croke. 1981, 30p
DOE/RA/50626-T1
Contract FG01-81RA50626

Small energy sources may provide a powerful tool for building energy self-reliance and advancing economic development in many countries of the Third World as well as in industrialized countries. This was the dominant theme of the UNITAR Conference on Small Energy Resources, held in Los Angeles, California, 9-18 September 1981. Over 300 delegates from some sixty countries attended ten tightly scheduled days of presentations, discussions and impromptu gatherings. Dr. Joseph Barnea, Scientific Secretary to the Conference and Senior Fellow of UNITAR, coordinated the far reaching programme which provided a fresh assessment of the world potential for rural energy development and pooled technical exchange. Oil, gas, shale, tar sand, coal, hydropower, geothermal, wind, biomass, and solar were addressed in this meeting. (ERA citation 10:002424)

514,907
DE85002246/GAR PC **A02**/MF **A01**
Los Alamos National Lab., NM.
Geothermal Pumping Systems.
R. J. Hanold. 1984, 15p LA-UR-84-3252, CONF-8410179-1
Contract W-7405-ENG-36
DOE geothermal technology conference, El Centro, CA, USA, 16 Oct 1984.

After successful field testing of a prototype pressurized lubrication system designed to prevent brine intrusion and loss of lubricating oil from the motor and protector sections of electric submersible pumps, a second-generation lubrication system has been designed, fabricated, and laboratory tested. Based on a sensitive downhole pressure regulator, this system is not depth limited and it accurately controls the differential pressure between the motor oil and the external brine. The first production lengths of metal sheathed power cable have been fabricated by Halpen Engineering and delivered to REDA for testing and evaluation. Laboratory tests performed on prototype metal sheathed cable samples have demonstrated the durability of this power cable design. The East Mesa Pump Test Facility is currently being activated for high-horsepower pumping system tests that are scheduled to commence during the first quarter of FY 85. A 300-horsepower REDA pumping system equipped with a pressure regulator controlled lubrication system and a metal sheathed power cable is being fabricated for testing in this unique facility. (ERA citation 10:002192)

514,908
DE85002249/GAR PC **A03**/MF **A01**
Argonne National Lab., IL.
Energy Supply and Use in United States Localities: The Institutional and Legal Setting.
N. F. Kron, and M. J. Meshenberg. Sep 83, 38p
ANL/CNSV-TM-141
Contract W-31-109-ENG-38
Portions are illegible in microfiche products. Original copy available until stock is exhausted.

This companion paper to the reports of US work on Subtask C, Annex 7, of the International Energy Agency Agreement provides a basic overview of the groups, laws, and organizational relationships that affect energy supply and use (conservation) in the US. This report provides general explanations of the broad diversity found in the laws and institutions that affect energy in the US, a large, heterogeneous country with several semi-independent levels of government and a strong private sector. The general explanations cover most situations and are provided for comparison with the experiences of other annex 7 nations. (ERA citation 10:002474)

514,909
DE85002329/GAR PC **A03**/MF **A01**
Oregon Inst. of Tech., Klamath Falls. Geo-Heat Center.
College of Idaho Geothermal System, Caldwell, Idaho.
K. Rafferty. Oct 84, 33p DOE/ID/12478-T7
Contract FG07-83ID12478
Portions are illegible in microfiche products.

There appears to be a good potential for a 160 exp 0 F resource at the College of Idaho site. Both existing well data and recent geologic and hydrologic investigations suggest that such a temperature should be available at a depth of approximately 3500 feet. Use of a temperature in the 160 exp 0 F range would not permit a 100% displacement of present natural gas use for space and domestic hot water. Because these systems were typically designed for 200 exp 0 F water or low pressure steam (approx. 220 exp 0 F), the performance of the existing equipment would be less than peak building requirements. However, even without major system modifications (the cost of which would be unreasonable), a geothermal system based on the above resource temperature would be capable of displacing about 78% of current natural gas consumption attributable to space and domestic hot water heating. The system outlined in the report would consist of a 3500 foot production well which would supply geothermal fluid to 12 major buildings on campus. Geothermal water would be passed through heat exchangers in each building. The heat exchangers would deliver heat to the existing heating loops. Most buildings would still require a small amount of input from the existing boiler during the coldest periods of the year. After having passed through the system, the geothermal water would then be injected into a disposal well. This is a key factor in the overall economics of the system. The assumption has been made that a full depth (3550 foot) injection well would be required. It is possible, though unclear at this point, that injection could be accomplished at a shallower depth into a similar aquifer. Since the injection well amounts to 24% of the total system capital cost, this is an important factor. (ERA citation 10:002198)

514,910
DE85002650/GAR PC **A14**/MF **A01**
BDM Corp., Albuquerque, NM.
Analysis of Concentrating PV-T Systems for the Commercial/Industrial Sector. Volume IV. Design Analysis and Trade-off Study.
W. E. Schwinkendorf. Sep 84, 322p SAND-82-7157/4
Contract AC04-76DP00789
Portions are illegible in microfiche products. Original copy available until stock is exhausted.

Detailed reference designs developed for optimally sized photovoltaic-thermal (PV-T) systems are presented for three selected applications. The results of trade-off analyses to determine the effects of load variations, new components, changes in location, and variations in array cost are also discussed. (ERA citation 10:002125)

514,911
DE85002683/GAR PC **A02**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Accelerated Aging of Aluminized Acrylic Solar Mirror Materials.
A. R. Mahoney, R. B. Pettit, and G. S. Kinoshita. Oct 84, 19p SAND-84-0532
Contract AC04-76DP00789
Portions are illegible in microfiche products. Original copy available until stock is exhausted.

The accelerated aging characteristics of an aluminized acrylic reflector material (3M Company ECP-244) were studied when bonded to either an aluminum or acrylic painted steel substrate. The aging consisted of temperature/humidity cycling between extremes of 54 exp 0 to -29 exp 0 C. After 255 days of environmental chamber exposure, the solar averaged specular reflectance values for both types of samples indicated no degradation, within experimental errors. Therefore, the acrylic painted steel substrate appears to be a suitable substitute for a sheet aluminum substrate. (ERA citation 10:002166)

514,912
DE85002709/GAR PC **A07**/MF **A01**
Tennessee Univ., Knoxville. Coll. of Business Administration.
Forecasts of on-Site and off-Site Occupational Requirements for Energy Construction Developments in the United States, 1983-1990.
Oct 84, 137p DOE/ER-0155/1
Portions are illegible in microfiche products. Original copy available until stock is exhausted.

This report forecasts labor requirements to construct, operate and maintain new capacity in the nation's energy producing sector. That sector includes coal, gas, oil, and uranium extraction and processing, electrical generation, and energy transportation, including pipelines, transmission and distribution lines and slurries. The estimates of new job openings were made from surveys conducted by Construction Resources Analysis (CRA) and energy supply forecasts made by the Department of Energy. They reflect employment opportunities associated with new energy facilities already under construction, those in advanced planning stages, and forecasted capacity additions during the 1983-1990 period. This report is a continuation and completion of earlier research conducted by CRA for the Department of Energy, using a computerized information system which produces regional forecasts of construction activity and job requirements for residential, nonresidential, non-building and energy construction. The report finds that the nation's new energy production activities will create approximately 59,000 new on-site jobs annually to operate and maintain the new production facilities and will provide about 440,000 jobs each year to construct these facilities. An additional 272,000 new positions in other segments of the economy will be needed annually to support the new energy activities. 53 references, 55 tables. (ERA citation 10:003368)

514,913
DE85002786/GAR PC **A03**/MF **A01**
Brookhaven National Lab., Upton, NY.
Evaluation of Modifications to the Mastin Double-Envelope House.
G. Dennehy, W. Loss, and R. F. Jones. Apr 84, 31p
BNL-51803
Contract AC02-76CH00016
Portions are illegible in microfiche products. Original copy available until stock is exhausted.

A double-envelope house in Middletown, RI, evaluated by Brookhaven National Laboratory personnel in 1981, was subsequently modified by the owner. The glazing in the roof was removed and replaced by skylights with only one-sixth as much area. The between-shells space was closed at the top of the north wall and at the top of the sunspace. Ducts and a thermostatically controlled fan were installed to draw warm air from the top of the sunspace and blow it through the crawl space. The house performance was re-monitored in 1983 to identify the effects of the modifications. In general, they served to reduce construction cost and improve comfort without increasing the house's low requirement for auxiliary heat. (ERA citation 10:002507)

514,914
DE85002818/GAR PC **A02**/MF **A01**
Department of Energy, Washington, DC.
Progress in Energy, 1983-1984.
Sep 84, 13p DOE/S-0030/1
Portions are illegible in microfiche products.

In October 1983, President Reagan submitted to Congress the fourth National Energy Policy Plan (NEPP-IV). In it he spelled out this Administration's energy policy. The policy consists of a goal and strategies to achieve that goal. Together, they provide a framework and focus for the full range of federal energy programs. (ERA citation 10:002450)

514,915
DE85003109/GAR PC **A02**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Special Function Instruments for Binary Cycle Geothermal Power Plants.
R. J. Robertus, D. W. Shannon, and R. G. Sullivan. Apr 84, 6p PNL-SA-12201, CONF-840809-21
Contract AC06-76RL01830
Geothermal Resources Council annual meeting, Reno, NV, USA, 27 Aug 1984.
Portions are illegible in microfiche products.

Three special instruments have been designed to support plant operations at the Heber geothermal power plant in Heber, California. All are aids to give operating information which no commercial instruments can provide. The first is a package for determining CO sub 2

breakout conditions for a particular brine. Brine is sampled continuously at either the wellhead or the plant inlet. A temperature-pressure curve is generated which will span all possible operating combinations. That information tells designers or operators what pump pressures must be used to keep the CO sub 2 in solution. A second package unit will detect the presence of ppM levels of isobutane in either brine or water streams. It samples actual flowing brine streams continuously. The function is to alert operators when leaks are occurring in heat exchangers. A final unit senses water in flowing hydrocarbon streams. The sampled streams can be either liquid or vapor. Sensitivity is close to actual solubility limit for water in isobutane. This device warns operators when their hydrocarbon has been contaminated with brine (or cooling water). (ERA citation 10:002188)

514,916

DE85003134/GAR PC **A04/MF A01**
Department of Energy, Washington, DC. Office of Energy Markets and End Use.
Short-Term Energy Outlook. Quarterly Projections, October 1984.
Nov 84, 52p DOE/EIA-0202(84/4Q)
Portions are illegible in microfiche products.

This report contains short-term forecasts of energy supply, demand, and prices from the last quarter of 1984 through 1985. The year 1984 so far has experienced very rapid economic growth, as the recovery from the recent recession continues. The demand for most energy sources in 1984 is expected to be up significantly from 1983 levels, in some instances reversing downward trends that have persisted for several years. In contrast, 1985 is projected to be a year of economic expansion, where the economy continues to grow, but at much lower rates than during 1984. The combination of lower economic growth and continued energy conservation in 1985 is expected to result in much slower growth in energy demand than during 1984. Domestic petroleum demand in 1984 will show an increase, on an annual basis, for the first time since 1978. Despite continued economic growth forecast for next year, however, US petroleum demand is projected to fall by about 1%. Growth in domestic coal consumption is projected to remain strong over the forecast period, with forecasted increases of nearly 8% from 1983 to 1984 and 6% from 1984 to 1985. 8 figures, 17 tables. (ERA citation 10:001870)

514,917

DE85003152/GAR PC **A13/MF A01**
Battelle Pacific Northwest Labs., Richland, WA.
Recommendations for Energy Conservation Standards and Guidelines for New Commercial Buildings. Volume III. Description of the Test Process. Appendix C: Life-Cycle Code Documentation.
Oct 83, 291p DOE/NBB-0051/9
Contract AC06-76RL01830
Portions are illegible in microfiche products.

TLCC18 is a life-cycle cost computer program developed at Pacific Northwest Laboratory (PNL). The model is designed to support economic analysis of energy conservation improvements to buildings. The model not only reflects real-world parameters, including utility rates, and tax policies, but also supports economic comparisons between proposed improvements to the building. The task of computing life-cycle costs is not in itself complicated, but complexities are introduced as the modeler attempts to introduce actual utility rate structures, local tax information, multiple fuel inflation rates, and operation, maintenance and capital replacement schedules over the lifetime of the building. TLCC18 captures these complexities to develop realistic life-cycle cost calculation for each case analyzed. The model compares different cases to calculate the internal rate-of-return and the fuel-switching point (among other comparative parameters) to provide the decision maker with information on the relative benefits of different improvements. Volume III is a description of the project's testing process and contains summaries of the energy and economic implications of the application of these recommendations to 10 test buildings across 7 climates. It is supported by appendices that document input data, assumptions, and computer codes employed in the testing process. (ERA citation 10:002512)

514,918

DE85003168/GAR PC **A12/MF A01**
Brookhaven National Lab., Upton, NY.
Modeling Tax Credit Incentives for Business Investment in Selected Energy Conservation and Production Technologies.
G. Anandalingam, S. P. A. Brown, and W. T. Blanco.
Mar 82, 255p BNL-31278
Contract AC02-76CH00016
Portions are illegible in microfiche products.

Some provisions of the 1978 Energy Tax Act and the 1980 Windfall Profits Tax Act offer temporary tax credits to businesses making qualified investments in energy capital. These tax credits are intended to provide incentives for energy conservation, new energy source development, and the substitution of other fuels for oil and gas. Qualifying investments include: specially defined energy property (principally waste heat recovery equipment), alternative energy property (principally non-oil or gas combustors), cogeneration equipment, inter-city buses, small hydroelectric facilities, solar and wind energy property, ocean thermal energy conversion equipment, equipment for producing natural gas from geopressurized brine, equipment for producing shale oil and solid waste energy recovery equipment. Included in this report are details of the various methodologies used for analysis and the estimated consequences of the tax credits. For each tax credit under examination that is applied to a well-established technology, the impact of the credit on the time paths of investment and energy saved, the net economic cost of the credit, the direct revenue cost of the credit to the Federal Treasury, and the external benefits per barrel of oil (or the energy equivalent of a barrel of oil) required to offset the net economic cost of the credit are estimated. (ERA citation 10:002429)

514,919

N85-13061/5/GAR PC **A06/MF A01**
Badische Anilin- und Soda-Fabrik A.G., Ludwigshafen am Rhein (Germany, F.R.).
Fluorescent Dyes for Luminescent Solar Concentrators.
Final Report, Jun. 1983.
R. Iden, G. Seybold, A. Stange, and H. Eilingsfeld.
Aug 84, 115p BMFT-FB-T-84-164
In German; English Summary. Sponsored by Bundesministerium fuer Forschung und Technologie.

Dyes were developed, for application in luminescent solar concentrators. Most suitable are perylen dyes and perylimid dyes, boron complexes of naphtholactam dyes and polycarbocyclic dyes. These compounds cover the whole color range from yellow to blue. In the yellow shade a perylimid shows extraordinary long term stability. A very stable blue dye emits over 650 nm with quantum yield of 92%. Methods for high purification of fluorescent dyes were worked out on a semitechnical scale.

514,920

N85-13375/9/GAR PC **A03/MF A01**
Jet Propulsion Lab., Pasadena, CA.
Concentrator Optical Characterization Using Computer Mathematical Modelling and Point Source Testing.
E. W. Dennison, S. L. John, and G. F. Trentelman.
15 Sep 84, 41p NAS 1.26:174109, DOE/JPL-1060-77, NASA-CR-174109
Contracts NAS7-918, DE-AM04-80AL-13137

The optical characteristics of a paraboloidal solar concentrator are analyzed using the intercept factor curve (a format for image data) to describe the results of a mathematical model and to represent reduced data from experimental testing. This procedure makes it possible not only to test an assembled concentrator, but also to evaluate single optical panels or to conduct non-solar tests of an assembled concentrator. The use of three-dimensional ray tracing computer programs to calculate the mathematical model is described. These ray tracing programs can include any type of optical configuration from simple paraboloids to array of spherical facets and can be adapted to microcomputers or larger computers, which can graphically display real-time comparison of calculated and measured data.

514,921

N85-13376/7/GAR PC **A04/MF A01**
Jet Propulsion Lab., Pasadena, CA.
Software Used with the Flux Mapper at the Solar Parabolic Dish Test Site.
C. Miyazono. 15 Sep 84, 63p NAS 1.26:174108, DOE/JPL-1060-78, NASA-CR-174108
Contracts NAS7-918, DE-AM04-80AL-13137

Software for data archiving and data display was developed for use on a Digital Equipment Corporation (DEC) PDP-11/34A minicomputer for use with the JPL-designed flux mapper. The flux mapper is a two-dimensional, high radiant energy scanning device designed to measure radiant flux energies expected at the focal point of solar parabolic dish concentrators. Interfacing to the DEC equipment was accomplished by standard RS-232C serial lines. The design of the software was dicated by design constraints of the flux-mapper controller. Early attemps at data acquisition from the flux-mapper controller were not without difficulty. Time and personnel limitations result in an alternative method of data recording at the test site with subsequent analysis accomplished at a data evaluation location at some later time. Software for plotting was also written to better visualize the flux patterns. Recommendations for future alternative development are discussed. A listing of the programs used in the anaysis is included in an appendix.

514,922

N85-13692/7/GAR PC **A02/MF A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Overview of Waste Heat Utilization Systems.
M. M. Bailey. 1984, 12p NAS 1.15:86901, DOE/NASA/50194-41, NASA-TM-86901
Presented at the 22ND Automotive Technol. Development Contractors' Coordination Meeting, Dearborn, Mich., 29 Oct. 1 Nov. 1984; Sponsored by Doe.

The heavy truck diesel engine rejects a significant fraction of its fuel energy in the form of waste heat. Historically, the Department of Energy has supported technology efforts for utilization of the diesel exhaust heat. Specifically, the Turbocompound and the Organic Rankine Cycle System (ORCS) have demonstrated that meaningful improvements in highway fuel economy can be realized through waste heat utilization. For heat recovery from the high temperature exhaust of future adiabatic diesel engines, the DOE/NASA are investigating a variety of alternatives based on the Rankine, Brayton, and Stirling power cycles. Initial screening results indicate that systems of this type offer a fuel savings advantage over the turbocompound system. Capital and maintenance cost projections, however, indicate that the alternative power cycles are not competitive on an economic payback basis. Plans call for continued analysis in an attempt to identify a cost effective configuration with adequate fuel savings potential.

514,923

PATENT-4 387 655 Not available NTIS
Department of the Interior, Washington, DC.
Method for Controlled Burnout of Abandoned Coal Mines and Waste Banks.
Patent,
R. F. Chaiken. Filed 10 May 82, patented 14 Jun 83, 14p PB85-141810, PAT-APPL-6-376 852
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $1.00.

A method is provided for recovering energy from wasted coal by the steps of creating at least one channel through the wasted coal, igniting the wasted coal in said channel, subjecting said wasted coal, at least at said channel, to a negative pressure applied at a preselected point, connecting said wasted coal, at least at said channel, to a source of air remote from said preselected zone whereby air is induced through said ignited coal to burn said coal to produce hot gaseous products of combustion, and the hot gaseous products of combustion are drawn from said zone, and utilizing said hot gaseous products of combustion in a heat exchange relationship to recover the heat energy therefrom.

514,924

PB85-142024/GAR PC **A10/MF A01**
Faucett (Jack) Associates, Inc., Chevy Chase, MD.

National Energy Accounts, 1958-1981.
Final technical rept.
Dec 84, 211p JACKFAU-84-316
Contract SABA-4-06114
Prepared in cooperation with Department of Energy, Washington, DC. Office of Industrial Programs.

Provides technical documentation of the methodology used in updating the National Energy Accounts database. The National Energy Accounts represent a balanced, annual account of all sources and uses of energy in the U.S. economy from 1958 through 1981. The detailed database (available separately from the U.S. Department of Commerce) includes 131 sectors of the economy, 15 functional use categories, and 35 energy products. Annual levels of consumption, production and inventory are reported in BTU's, physical units, current dollar value, and constant (1972) dollar value.

514,925
PB85-149748/GAR PC **A03**/MF **A01**
Precision Machine Products, Inc., Dallas, TX.
Energy Flowmeter Development, Phases 1 and 2.
Final rept. Jan 82-May 84,
W. H. Clingman, and K. R. Hall. Jun 84, 50p GRI-84/0149.1
Contract GRI-5081-271-0601

An energy flowmeter has been developed and a first prototype successfully tested at a natural gas desulphurization plant. This prototype directly measures the rate of energy delivered to a gas fired furnace without having to separately determine the volumetric flow rate and heating value of the gas. By replacing two measurements with one it is expected to lower the cost of the equipment required, increase reliability, and more accurately measure energy delivered.

514,926
PB85-151322/GAR PC **A06**/MF **A01**
United Technologies Corp., South Windsor, CT. Power Systems Div.
Follow-On 40-kW Field Test Support.
Annual rept. Jul 83-Jun 84,
J. W. Staniunas, G. P. Merten, and R. M. Smith. Aug 84, 123p FCR-6494, GRI-84/0131
Contract GRI-5080-344-0308

With the delivery of the first nine 40-kW fuel cell power plants completed in early 1984, the fuel cell field test project has moved into the power plant test phase. The activities of the past year concentrated on supporting the utilities in the selection of field test sites through instrumented site data analyses, Final Site Selection Report (FSSR) reviews, and the review of fuel cell site installation drawings. As of June 1984, hourly electrical and thermal systems data have been monitored at 71 candidate sites and 7 fuel cell test sites. The initial power plant data shows that electrical efficiencies of 40% and overall efficiencies of 80% have been achieved in a variety of field applications. This data is supporting application analysis beyond the specifics of the individual field test sites. Approaches have been developed for characterizing site energy requirements with a limited amount of hourly data. Comparison of a simplified technique for evaluating on-site fuel cell systems with detailed hands-on analysis has confirmed the validity of these approaches. Analysis of fuel cell sizing and operating modes has provided a better understanding of its impact on utility revenues, gas sales and customer savings. These application analyses are useful in establishing power plant technical requirements and providing focus for utility market and application assessments.

514,927
PB85-914700/GAR Subscription
Department of Energy, Oak Ridge, TN. Technical Information Div.
Geothermal Energy Technology.
Semimonthly repts.
1985, 24 issues
Supersedes PB84-914700.
Paper copy available on subscription, North American Continent price $40.00/year; all others write for quote. Also available in single copies.

Geothermal Energy Technology announces on a semimonthly basis the current worldwide information available on the technology required for economic recovery of geothermal energy and its eventual utilization either directly or for production of electric power. The summaries in this bulletin and all citations to information on geothermal energy back to January 1967 are available for on-line searching and retrieval using the DOE/RECON system. Citations from June 1976 to the present are available on the Energy Data Base, which may also be searched using the commercial on-line retrieval systems. Retrospective searches can be made on any aspect of geothermal energy, or customized profiles can be developed to provide current information for each user's needs.

10B. Power Sources

514,928
DE84014425/GAR PC **A03**/MF **A01**
General Electric Co., Schenectady, NY. Advanced Energy Programs Dept.
Development of Molten Carbonate Fuel Cell Power Plant. Quarterly Technical Progress Report, February 1-April 30, 1983.
1983, 50p DOE/ET/17019-13
Contract AC02-80ET17019
Portions are illegible in microfiche products. Original copy available until stock is exhausted.

During the initial part of this report period, program effort was entirely directed toward accomplishing a successful demonstration of performance repeatability. Starting in February, a series of twelve identical 100 cm exp 2 cells have been operated. All cells contained .020" hot-rolled, coated particle tiles. Test conditions for each cell were set at 75% hydrogen utilization of standard fuel (0.6H sub 2 /0.4 CO sub 2 - humidified at 140 exp 0 F) and 55% CO sub 2 utilization of standard oxidant (0.25 CO sub 2 /0.75 air-humidified at 140 exp 0 F). All cells surpassed the program goal of .725V at 160 mA/cm exp 2 . Averaged performance for the twelve cells was 984 mV at open circuit and 758 mV at load voltage at 160 mA/cm exp 2 . During the latter part of the report period, effort was redirected to focus on preparations for the next program goal: test of a 12" x 12" sheet metal cell. Development of the manifold seal ring design continued with test results showing acceptable leakage rates and insulating characteristics. Analyses were conducted to evaluate the effects of operating temperature and time on creep relaxation in the seal. An investigation of electrolyte loss mechanisms was initiated to support definition of electrolyte storage and management requirements for improved endurance. During this period, component electrolyte distribution was measured by post mortem analysis of sixteen cells for comparison to initial electrolyte loadings. Efforts were also directed toward the production of powders to support tile fabrication, an investigation of tile conductivity, the development of .030" NiO cathodes and the fabrication of Ni/Cu coated ceramic anodes to support the test program. (ERA citation 10:002492)

514,929
DE84014426/GAR PC **A03**/MF **A01**
General Electric Co., Schenectady, NY. Advanced Energy Programs Dept.
Development of Molten Carbonate Fuel Cell Power Plant. Quarterly Technical Progress Report, May 1-July 31, 1983.
1983, 32p DOE/ET/17019-14
Contract AC02-80ET17019
Portions are illegible in microfiche products. Original copy available until stock is exhausted.

Major emphasis during this report period has been directed toward preparing for the 12" x 12" cell test. Sheet metal forming problems have been resolved and development of weld process procedures is continuing. Major components for the test facility have been received to permit facility assembly next month as planned. Scaleup of electrochemical components is continuing. Cell test results indicate that performance is relatively insensitive over a 1.0 to 2.0 mu m particle size in the matrix tape, which will ease powder preparation requirements. Scaled-up .030" thick cathodes were also fabricated to permit investigating performance and strength improvements over .015" cathodes. Electrolyte loss mechanisms were correlated to experimental results. Reasonably good agreement was achieved in quantifying electrolyte loss and distribution in cells run for approximately 400 hours by accounting for Lithium consumption in the electrodes. Longer term experiments have been initiated. Efforts to identify alternate binder systems for matrix tape development continued, with the objective of improved fabricability. (ERA citation 10:002493)

514,930
DE84015597/GAR PC **A07**/MF **A01**
Westinghouse Research and Development Center, Pittsburgh, PA.
High-Temperature, Solid Oxide Electrolyte Fuel Cell Power Generation System. Annual Report, June 1, 1981-May 31, 1982.
28 Jun 82, 129p DOE/ET/17089-T3
Contract AC02-80ET17089

One-end closed porous support tubes of calcia-stabilized zirconia, fired at a lower sintering temperature, are being prepared and used in FBA cell fabrication experiments. La sub 0 sub 9 Sr sub 0 sub 1 MnO sub 3 has been selected as the present state-of-the art air electrode, with work to develop better air electrode materials continuing. FBA cells have been fabricated that meet acceptable performance levels, when operated on simulated coal gas fuel at high fuel utilization levels. In work related to evaluation of SOFC generator design concepts: (1) spent fuel combustion tests have been performed to establish ignition delay times, (2) thermal/hydraulic tests related to spent fuel behavior have been performed and (3) a 9-cell mockup test has been designed and equipment is being fabricated to perform this test. A cell computerized performance code has been developed that, based on cell operating condition assumptions, allows prediction of temperature and temperature variation and current variation along the length of the FBA cell. (ERA citation 10:000779)

514,931
DE85000436/GAR PC **A04**/MF **A01**
Alaska Power Administration, Juneau.
Alaska Electric Power Statistics, 1960-1983. Ninth Edition.
Sep 84, 55p DOE/NBM-5000436
Portions are illegible in microfiche products.

This is the ninth in a series of statewide electric power data summaries complied by the Alaska Power Administration (APA). It continues the efforts by APA to provide a convenient and current reference source on Alaska power system data and trends in statewide electric power use. The report has fairly complete data summaries through calendar year 1983 with some monthly data for the early part of 1984. Included are data series for the electric utility systems, national defense installations, and self-supplied industrial systems. Several new, small utilities were added to the data this year. (ERA citation 10:002466)

514,932
DE85000760/GAR PC **A05**/MF **A01**
Avco-Everett Research Lab., Inc., Everett, MA.
MHD Channel Component Development. Quarterly Report, April-June 1984.
Aug 84, 82p DOE/PC/70507-1
Contract AC22-84PC70507
Portions are illegible in microfiche products. Original copy available until stock is exhausted.

The overall objectives of this program are: to contribute, by appropriate systematic experimental and analytical investigations, to the engineering data base necessary for the design and construction of MHD generators at the 50 MW/sub th/ scale and ultimately at commercial sizes, and to design and fabricate specific 50 MW/sub th/ scale power train hardware to be tested at a site to be specified by DOE. The program consists of a series of related tasks as follows: Task 1 - MHD channel design and performance; Task 2 - MHD channel development and lifetime; Task 3 - MHD channel loading and control; Task 4 - CDIF hardware, design, fabrication and testing; and Task 5 - support function 1 - facility operation. Progress is reported. (ERA citation 10:002487)

514,933
DE85000781/GAR PC **A03**/MF **A01**
Argonne National Lab., IL.
Advanced Fuel Cell Development. Progress Report, October-December 1983.
R. D. Pierce, P. E. Blackburn, T. D. Claar, R. J. Fousek, and H. S. Huang. Aug 84, 47p ANL-84-38
Contract W-31-109-ENG-38

This report describes fuel cell research and development activities at Argonne National Laboratory (ANL) during the period October through December 1983. These efforts have been directed principally toward seeking alternative cathode materials to NiO for

molten carbonate fuel cells. Based on an investigation of the thermodynamically stable phases formed under cathode conditions, a number of prospective alternative cathode materials have been identified. The materials LiFeO sub 2 , Li sub 2 MnO sub 3 , and ZnO were selected from that list for investigation during this period. They have been doped to promote conductivity and tested for solubility and ion migration in the cell environment. The compound Li sub 2 MnO sub 3 has proved most attractive, and techniques are being studied for the preparation of thin cathodes by tape casting the Li sub 2 MnO sub 3 product. (ERA citation 10:002490)

514,934

DE85000854/GAR PC A09/MF A01
Arnold Engineering Development Center, Arnold AFS, TN.
MHD Performance Demonstration Experiment, FY 1974 to FY 1984. Final Report.
G. L. Whitehead, L. S. Christensen, and E. J. Felderman. Jun 84, 190p DOE/ET/11417-20
Contract AI22-78ET11417
Portions are illegible in microfiche products. Original copy available until stock is exhausted.

Mounting concern over the world's fuel reserves, in general, and increasing dependence of the US on foreign oil, in particular, led the Energy Research and Development Administration (ERDA) to undertake a national program for the development of commercial, open-cycle, magnetohydrodynamic (MHD) power generation. The emphasis of that national program was, and is, on establishing the engineering feasibility of using coal to fuel the MHD power system. In order to establish feasibility it was necessary to experimentally demonstrate that an MHD generator system simulating a commercial-sized device can convert 16 to 18% of the available thermal energy into electric power at an isentropic efficiency of 60 to 70%. A presidential decree encouraged any government agency which might possess an organic MHD capability to assist ERDA in formulating and executing the national program. Since the largest MHD facility in the United States was located at the Arnold Engineering Development Center (AEDC), it was selected to be the national program element to demonstrate performance. As a result, the AEDC has been under contract since December 1973 (first to ERDA, later to its successor, the Department of Energy, DOE) to modify existing equipment and to design, fabricate, and install new hardware to perform the MHD Performance Demonstration Experiment. This report describes the facility which was developed to conduct that research and summarizes all results achieved to date in pursuit of the project objectives. 21 references, 110 figures. (ERA citation 10:002482)

514,935

DE85001456/GAR PC A06/MF A01
Battelle Pacific Northwest Labs., Richland, WA.
User's Guide for the BNW-III Optimization Code for Modular Dry/Wet-Cooled Power Plants.
D. J. Braun, and D. W. Faletti. Sep 84, 102p PNL-4506
Contract AC06-76RL01830
Portions are illegible in microfiche products. Original copy available until stock is exhausted.

This user's guide describes BNW-III, a computer code developed by the Pacific Northwest Laboratory (PNL) as part of the Dry Cooling Enhancement Program sponsored by the US Department of Energy (DOE). The BNW-III code models a modular dry/wet cooling system for a nuclear or fossil fuel power plant. The purpose of this guide is to give the code user a brief description of what the BNW-III code is and how to use it. It describes the cooling system being modeled and the various models used. A detailed description of code input and code output is also included. The BNW-III code was developed to analyze a specific cooling system layout. However, there is a large degree of freedom in the type of cooling modules that can be selected and in the performance of those modules. The costs of the modules are input to the code, giving the user a great deal of flexibility. (ERA citation 10:002215)

514,936

DE85001515/GAR PC A04/MF A01
Avco-Everett Research Lab., Inc., Everett, MA.
MHD Generator Component Development. Quarterly Report, April-June 1984.
Aug 84, 56p DOE/ET/15614-20
Contract AC22-80ET15614

The overall objectives of this program are twofold: (1) to contribute, by appropriate systematic experimental and analytical investigations, to the engineering data base necessary to the design and construction of MHD generators at CDIF-scale (50 MW/sub th/) and baseload scale (2000 MW/sub th/); and (2) to design and fabricate specific hardware items to be tested at the CDIF site in Butte, Montana. Progress is reported on the following tasks: Task 1: MHD channel design and performance; Task 2: MHD channel construction and lifetime; Task 3: MHD channel loading and control; Task 4: facility operation; Task 5: CDIF related hardware; and Task 6: high interaction tests of a supersonic channel. (ERA citation 10:002485)

514,937

DE85001516/GAR PC A06/MF A01
Avco-Everett Research Lab., Inc., Everett, MA.
MHD Generator Component Development. Quarterly Report, January-March 1984.
May 84, 114p DOE/ET/15614-19
Contract AC22-80ET15614

Progress is reported on the following 4 tasks: Task 1 - MHD Channel Design and Performance, a series of tests has been performed at the CDIF to investigate the performance characteristics of the Avco CDIF 1A1 MHD generator channel. The effect of cathode shorting on internal MHD electrical characteristics has been investigated. Task 2 - MHD Channel Construction and Lifetime, several ceramic materials cooled with gas, water or contact were tested. The best insulating material appears to be a hot pressed silicon nitride. Task 3 - MHD Channel Loading and Control, two new prototypical four oil on one core transformers were successfully tested. Extensive bench top tests of the new GTO/four coil transformer circuits were completed. Initial on-channel testing was performed. Task 4 - CDIF Hardware, Design, Fabrication and Testing, improvements were made in the magnetic calibration and control circuits. Removable shim pieces provide flexibility in aperature size. (ERA citation 10:002484)

514,938

DE85002156/GAR PC A05/MF A01
Westinghouse Electric Corp., Pittsburgh, PA. Advanced Energy Systems Div.
MHD Generator Electrode Development. Summary Report, July 1, 1981-September 30, 1982.
B. R. Rossing, R. W. Buckman, W. D. Pouchot, and D. L. Dietrick. Jul 84, 98p DOE/ET/15529-12, FE-15529-12
Contract AC22-79ET15529
Portions are illegible in microfiche products. Original copy available until stock is exhausted.

Emphasis on this program was the development of and understanding wastage mechanism(s) of metallic electrodes which may be suitable alternatives to platinum anode material for use in long-term open cycle, coal-fired MHD generator operations. The laboratory tests simulate both modes of material wastage observed in MHD electrode operation; i.e., arc erosion (melting/vaporization) and electrochemical corrosion. Based on experimental results from the electrochemical tests at 1473 exp 0 K, the rank order listing of the materials tested for anode applications were platinum, E-Brite 26-1 modified with a five percent addition of platinum, chromium, IN 601, E-Brite 26-1, and 330 stainless steel ranked in decreasing order. The rank order listing based on the arc erosion test was platinum, chromium, E-Brite 26-1, 330 stainless steel, and IN 601. The relative arc erosion resistance of materials based on the AVCO Mark VII generator test results gave a rank order of platinum, 330 stainless steel, IN 601, and E-Brite 26-1. Engineering tests under simulated open-cycle coal-fired MHD operating conditions were performed in the 500 kW Westinghouse Electrode System Test Facility (WESTF). Tests were conducted on candidate metallic anode materials (cold wall) and ceramic anode (hot wall) materials. A ten-hour duration cold wall slagging test was conducted on platinum, E-Brite 26-1, 330 stainless steel and IN 601 and the results were similar to those obtained for those materials in the AVCO Mark VII generator tests. Non-slagging, super hot (>1700 exp 0 C) wall hafnia-rare earth oxide electrodes were tested in a sulfurous, western coal-fired MHD environment. All four ceramic electrode pairs were destroyed. 20 references. (ERA citation 10:002483)

514,939

DE85002212/GAR PC A04/MF A01
Purdue Univ., Lafayette, IN.
MOD Silver Metallization for Photovoltaics. Quarterly Technical Report, June 1-August 31, 1984.
G. M. Vest, and R. W. Vest. 28 Sep 84, 56p DOE/JPL/956679-84/3
Contract NAS-7-100-956679
Portions are illegible in microfiche products. Original copy available until stock is exhausted.

A new Pt metallo organic compound, Pt 2-ethylhexanoate, was synthesized and fabricated into an ink. This new Pt compound was superior to all other compounds investigated because the ink printed better, was stable for a longer time and the carbon decomposition was finished at 285 exp 0 C. The line definition, adhesion and sheet resistance of the tunnel kiln fired samples were at least as good as any of the previous inks, thus inks consisting of Ag neodecanoate and Pt 2-ethylhexanoate in benzene solutions with butyl carbitol acetate and neodecanoic acid as the screening agents will be used in all future inks. The 4% Pt addition to the ink was shown to give a marked improvement in solder leach resistance. Excellent initial adhesion was always obtained when the preferred firing sequence was used, but the adhesion was found to degrade with time. (ERA citation 10:000384)

514,940

DE85002608/GAR PC A04/MF A01
Argonne National Lab., IL.
Summary of District Heating and Cooling Project in Moorhead, Minnesota.
A. S. Kennedy, and G. N. Reddy. Sep 84, 60p ANL/CNSV-TM-147
Contract W-31-109-ENG-38
Portions are illegible in microfiche products. Original copy available until stock is exhausted.

The project proposed was to retrofit the municipal power plant of the Moorhead Public Service Department (PSD) to function as a cogeneration plant providing the heat source for a medium-temperature (225 exp 0 F), hot-water DHC system. Development of the system would proceed in five stages, beginning with service to Moorhead State University and Concordia College in 1984. Expansion to the central business district and other commercial, residential, and industrial areas would proceed in subsequent phases, with the entire system scheduled to be completed in 1989. The thermal capacity of the DHC system proposed for Moorhead could reach 60 to 100 MW/sub t/ in six years. Furthermore, if the city of Fargo, North Dakota, which is located immediately across the Red River, were to join the system, thermal loads could grow to 200 MW/sub t/. Heat supplied from a refuse-fired municipal boiler facility is an attractive option for expanding the system to that scale, but was not considered within the scope of this study. The results of the Moorhead multiphase work program and the present status of project implementation are summarized herein. (ERA citation 10:002560)

514,941

DE85002634/GAR PC A02/MF A01
Sandia National Labs., Albuquerque, NM.
Utility-Interactive Photovoltaic Power Conditioning Technology in the United States.
T. S. Key, and S. Krauthamer. 1984, 9p SAND-84-2025C, CONF-841129-1
Contract AC04-76DP00789
International photovoltaic science and engineering conference and exhibition, Kobe, Japan, 13 Nov 1984. Portions are illegible in microfiche products.

During the last five years the United States Department of Energy has investigated power conditioning concepts for photovoltaic systems ranging from small residential applications to large central power generating plants. Through the joint efforts of private industry and government, a wide variety of hardware has been developed and evaluated. Applying this hardware experience and the results of power conditioning design studies, we are able to compare design options from 2 kW to 5 MW. Both line- and self-commutated inverter designs for single- and three-phase applications are described. The most promising design approaches are identified. (ERA citation 10:002126)

514,942

DE85002670/GAR PC A06/MF A01
Central Maine Power Co., Augusta.

Shawmut Hydroelectric Redevelopment Project. Final Operation and Maintenance Report.
Jun 84, 114p DOE/ID/12126-2
Contract FC07-80ID12126
Portions are illegible in microfiche products. Original copy available until stock is exhausted.

It is required that Central Maine Power Company furnish the DOE complete operation and maintenance data and generation cost statistics covering a period of two years following generation of first power at the Shawmut demonstration facility. The report discusses major design, operation and maintenance problems, energy production, operation and maintenance costs and the net cost of electricity for two years of commercial operation. (ERA citation 10:002070)

514,943
DE85002792/GAR PC **A04**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Leak Detectors for Organic Rankine Cycle Power Plants: On-Line and Manual Methods.
R. J. Robertus, K. H. Pool, C. H. Kindle, R. G. Sullivan, and D. W. Shannon. Oct 84, 60p PNL-5261
Contract AC06-76RL01830

Two leak detector systems have been designed, built, and tested at a binary-cycle (organic Rankine cycle) geothermal plant. One system is capable of detecting water in hydrocarbon streams down to 100 ppM liquid water in liquid isobutane. The unit first cools and/or condenses the hydrocarbon sample stream in a small heat exchanger. The cooled liquid stream flows to a large settling chamber where the water and isobutane separate because of density differences. Any water present is collected in a pipe and automatically dumped using a solenoid operated valve when the level reaches a certain point. The magnitude of the leak is estimated from the frequency at which the solenoid operated valve opens and closes, i.e. the amount of water collected in a known period of time is directly related to the number of dump cycles. The second system can detect the presence of isobutane in water or brine streams down to 2 ppM liquid isobutane in liquid water or brine. The unit first cools the liquid stream if necessary then reduces the pressure in an expansion chamber so the hydrocarbon will vaporize. In brine streams flashed CO sub 2 carries the hydrocarbon to a non-dispersive infrared analyzer (NDIR). (In cooling water streams a nitrogen carrier gas is used to transport the hydrocarbon to the analyzer). The NDIR has been modified to be highly selective for isobutane. One can estimate the size of a leak knowing the total gas-to-liquid ratio entering the leak detection system and the concentration of hydrocarbon in the gas phase. Four of the leak detector systems will be installed in the Heber Geothermal Demonstration Plant at Heber, California. Two will be on the hydrocarbon system, one on the brine system, and one on the cooling water system. (ERA citation 10:002187)

514,944
N85-13157/1/GAR PC **A03**/MF **A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Control Aspects of the Schuchuli Village Stand-Alone Photovoltaic Power System.
Final Report.
P. P. Groumpos, J. E. Culler, and R. Delombard. Nov 84, 31p NAS 1.15:83790, DOE/NASA/20485-17, NASA-TM-83790
Contract DE-AI01-79ET-20485

A photovoltaic power system in an Arizona Indian village was installed. The control subsystem of this photovoltaic power system was analyzed. The four major functions of the control subsystem are: (1) voltage regulation; (2) load management; (3) water pump control; and (4) system protection. The control subsystem functions flowcharts for the control subsystem operation, and a computer program that models the control subsystem are presented.

514,945
N85-13371/8/GAR PC **A07**/MF **A01**
United Technologies Corp., South Windsor, CT.
Regenerative Fuel Cell Energy Storage System for a Low Earth Orbit Space Station.
R. E. Martin, J. Garow, and K. B. Michaels. Aug 84, 146p NAS 1.26:174802, FCR-6128, NASA-CR-174802
Contract NAS3-22234

Results of a study to define the characteristics of a regenerative fuel cell energy storage system for a large space station operating in low earth orbit (LEO) are presented. The regenerative fuel cell system employs an alkaline electrolyte fuel cell with the option of employing either an alkaline or a solid polymer electrolyte electrolyzer.

514,946
N85-13372/6/GAR PC **A11**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
International Test and Demonstration of a 1-Mw Wellhead Generator: Helical Screw Expander Power Plant.
Final Report.
R. A. Mckay. 1 Jun 84, 234p NAS 1.26:174161, JPL-PUB-84-29, NASA-CR-174161
Contracts NAS7-918, DE-AI03-79ET-37116

A 1-MW wellhead generator was tested in 1980, 1981, and 1982 by Mexico, Italy, and New Zealand at Cerro Prieto, Cesano, and Broadlands, respectively. The total flow helical screw expander portable power plant, Model 76-1, had been built for the U.S. Government and field-tested in Utah, USA, in 1978 and 1979. The expander had oversized internal clearances designed for self-cleaning operation on fluids that deposit adherent scale normally detrimental to the utiliation of liquid dominated fields. Conditions with which the expander was tested included inlet pressures of 64 to 220 psia, inlet qualities of 0% to 100%, exhaust pressures of 3.1 to 40 psia, electrial loads of idle and 110 to 933 kW, electrical frequencies of 50 and 60 Hz, male rotor speeds of 2500 to 4000 rpm, and fluid characteristics to 310,000 ppm total dissolved solids and noncondensables to 38 wt % of the vapor. Some testing was done on-grid. Typical expander isentropic efficiency was 40% to 50% with the clearances not closed, and 5 percentage points or more higher with the clearances partly closed. The expander efficiency increased approximately logarithmically with shaft power for most operations, while inlet quality, speed, and pressure ratio across the machine had only small effects. These findings are all in agreement with the Utah test results.

514,947
PB85-142750/GAR PC **E04**/MF **E01**
United Nations Industrial Development Organization, Vienna (Austria).
Small Hydro Power (SHP) Bulletin No. 1.
15 May 84, 32p UNIDO/IS.467, V-84-86167

Information is given on development of small-scale hydroelectric power generation in developing countries. It covers (1) news regarding institutional framework; ESCAP network and the regional development center in Hangzhou, China (2) SHP activities in eleven countries (3) international cooperation (4) innovations and advanced technology in SHP reported from USA (5) past and planned training programmes.

514,948
PB85-144293/GAR PC **E06**/MF **E06**
Sussex Univ., Brighton (England). Science Policy Research Unit.
UK (United Kingdom) Industrial Energy Demand: Economic and Technical Change in the Steam Boiler Stock.
Occasional paper series,
J. Chesshire, and M. Robson. c1983, 120p SPRU/OP/SER-19, ISBN-0-903622-20-3-OP-19

This report is based on a four year study, including a survey of a sample of 30,000 out of the estimated total of 73,000 steam boilers currently installed in UK industry and commerce. The main aim of the report is to identify likely future changes in the level and pattern of boiler fuel use which will be largely determined by the characteristics of the current capital stock of boilers. In particular, it focuses on the interaction between capital costs, fuel prices and load factors, and the distribution of output capacities, design types and the age profile of the boiler stock. (Copyright (c) Science Policy Research Unit University of Sussex March 1983.)

514,949
PB85-149540/GAR
(Order as PB85-149532/GAR, PC **E06**/MF **E01**)
Toshiba Corp., Tokyo (Japan).
Transistorized Inverter and Examples of Its Application,
T. Tsuchiya, T. Ohtsuka, and T. Ambo. c1984, 6p
Text in Japanese.
Included in Toshiba Review, v39 n12 p1041-1046 1984.

Due to the progress of power electronics and microelectronics, the transistorized inverter controls have made rapid advance and have come to be applied practically. The writers herein outline (1) the inverter, 'TOSVERT' - 130 series for general-purpose variable-speed drive, (2) the inverter, 'TOSVERT' - 150 series, for high-performance variable-speed drive, and (3) the superhigh-accuracy servo driver RA-D 01/10 series. Presented also are the examples of their application in various fields of industry.

514,950
PB85-855393/GAR PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Cogeneration: Economic and Technical Analysis. 1975-February 1985 (Citations from the INSPEC: Information Services for the Physics and Engineering Communities Data Base).
Rept. for 1975-Feb 85.
Feb 85, 249p
Supersedes PB84-860378.

This bibliography contains citations concerning economic and technical analysis of cogeneration systems. Topics include electric power generation, industrial cogeneration, electricity supply industry, and fuel cell cogeneration. Steam power station, gas turbine and steam turbine technology, district heating, refuse derived fuels, environmental effects and regulations, bioenergy and solar energy conversion, waste heat and waste product utilization, and performance analysis are also included. (This updated bibliography contains 333 citations, 77 of which are new entries to the previous edition.)

10C. Energy Storage

514,951
DE84770486/GAR PC **A09**/MF **A01**
Technische Hochschule, Aachen (Germany, F.R.). Fakultaet fuer Maschinenwesen.
Flywheel Energy Storage Systems as Vehicle Drive Elements.
Diss. (Dr.-Ing.),
J. W. Biermann. 12 May 81, 186p NP-4770486
In German.
U.S. Sales Only. Portions are illegible in microfiche products.

Apart from low pollution and high economy, the driving system must also ensure a satisfactory driving performance and a long driving range. A power density of 100 W/kg and an energy density of 200 Wh/kg are stated as minimum requirements and road vehicle drives. Flywheels help to avoid energy losses, owing to the fact that the driving energy in rotors is available as kinetic energy so that energy conversion becomes unnecessary. Requirements on vehicle flywheel drives are listed. Constructional and operating parameters were compiled and expressed in formulas for the purpose of computer simulation. The mathematical representations are validated by test bench experiments. A parameter study was carried out in order to assess the efficiency of different measures to meet these requirements. Uses of flywheels as vehicle drive elements are listed. (ERA citation 10:000718)

514,952
DE85000217/GAR PC **A02**/MF **A01**
Winship (Catherine T.), Winston-Salem, NC.
Hollow Ceramic Block: Containment of Water for Thermal Storage in Passive Solar Design. Final Technical Report.
C. T. Winship. 27 Dec 83, 18p DOE/R4/10210-T1
Contract FG44-80R410210
Portions are illegible in microfiche products.

The project activity has been the development of designs, material compositions and production procedures to manufacture hollow ceramic blocks which contain water (or other heat absorptive liquids). The blocks are designed to serve, in plurality, a dual purpose: as an unobtrusive and efficient thermal storage element, and as a durable and aesthetically appealing surface for floors and walls of passive solar building interiors. Throughout the grant period, numerous ceramic formulas have been tested for their workabilty, thermal properties, maturing temperatures and color. Blocks have been designed to have structural integrity,

and textured surfaces. Methods of slip-casting and extrusion have been developed for manufacturing of the blocks. The thermal storage capacity of the water-loaded block has been demonstrated to be 2.25 times greater than that of brick and 2.03 times greater than that of concrete (taking an average of commonly used materials). Although this represents a technical advance in thermal storage, the decorative effects provided by application of the blocks lend them a more significant advantage by reducing constraints on interior design in passive solar architecture. (ERA citation 10:000409)

514,953
DE85000288/GAR PC **A04/MF A01**
Battelle Pacific Northwest Labs., Richland, WA.
Underground Pumped Hydroelectric Storage.
R. D. Allen, T. J. Doherty, and L. D. Kannberg. Jul 84, 72p PNL-5142
Contract AC06-76RL01830

Underground pumped hydroelectric energy storage was conceived as a modification of surface pumped storage to eliminate dependence upon fortuitous topography, provide higher hydraulic heads, and reduce environmental concerns. A UPHS plant offers substantial savings in investment cost over coal-fired cycling plants and savings in system production costs over gas turbines. Potential location near load centers lowers transmission costs and line losses. Environmental impact is less than that for a coal-fired cycling plant. The inherent benefits include those of all pumped storage (i.e., rapid load response, emergency capacity, improvement in efficiency as pumps improve, and capacity for voltage regulation). A UPHS plant would be powered by either a coal-fired or nuclear baseload plant. The economic capacity of a UPHS plant would be in the range of 1000 to 3000 MW. This storage level is compatible with the load-leveling requirements of a greater metropolitan area with population of 1 million or more. The technical feasibility of UPHS depends upon excavation of a subterranean powerhouse cavern and reservoir caverns within a competent, impervious rock formation, and upon selection of reliable and efficient turbomachinery - pump-turbines and motor-generators - all remotely operable. (ERA citation 10:000717)

514,954
DE85000993/GAR PC **A03/MF A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
NASA Redox Storage System Development Project. Final Report.
N. H. Hagedorn. Oct 84, 46p DOE/NASA/12726-24, NASA-TM-83677
Contract AI04-80AL12726

The Redox Storage System Technology Project was jointly supported by the US Department of Energy and NASA. The objectives of the project were to develop the Redox flow battery concept and to prove its technical and economic viability. The iron and chromium redox couples were selected as the reactants. Membranes and electrodes were developed for the original mode of operating at 25 exp 0 C with the reactants separated by an ion-exchange membrane. Analytical capabilities and system-level operating concepts were developed and verified in a 1-kW, 13-kWh pre-prototype system. A subsequent change was made in operating mode, going to 65 exp 0 C and using mixed reactants. New membranes and a new electrode catalyst were developed, resulting in single cell operation as high as 80 mA/cm exp 2 with energy efficiencies greater than 80%. Studies indicate a likely system cost of about $75/kWh. Standard Oil of Ohio (Sohio) has undertaken further development of the Redox system. An exclusive patent license was obtained from NASA by Sohio. Transfer of Redox technology to Sohio is supported by the NASA Technology Utilization Office. This report covers the full duration of the project. (ERA citation 10:002416)

514,955
DE85001032/GAR PC **A03/MF A01**
Pennsylvania Univ., Philadelphia.
Polymeric Electrolytes for Ambient Temperature Lithium Batteries. Final Report.
G. C. Farrington. Aug 84, 30p LBL-18288
Contract AC03-76SF00098

Polyacetylene can be electrochemically oxidized in a cell of the type, Li/LiX in propylene carbonate/(CH)/sub x/, with nearly 100% coulombic efficiency for doping levels (y in (CH(ClO sub 4)/sub y/)/sub x/), of less than 0.10. At higher values, the electrochemical potential of the oxidized film is above 3.9 V vs. Li/Li exp + , and the electrolyte is unstable. Reduced polyacetylene (Li/sub y/CH)/sub x/ can serve as an anode in a non-aqueous electrolyte battery in the traditional role of lithium. However, stable voltages and high coulombic efficiency for the reduction/oxidation process in an electrolyte of LiClO sub 4 in tetrahydrofuran are only observed at reduction levels of y<about 0.10. In addition, the potential of a polyacetylene anode doped with Li exp + is 0.5 to 1.5 V positive to that of Li in the same solution. At present, polyacetylene electrodes are rather unstable, sensitive to impurities, and characterized by low volumetric energy density, and low-moderate gravimetric energy density. They do not appear to offer major advantages for use in high energy density, rechargeable, non-aqueous electrochemical cells. (ERA citation 10:002419)

11.

MATERIALS

11A. Adhesives and Seals

514,958
PATENT-4 486 179 Not available NTIS
Department of Health and Human Services, Washington, DC.
Biocompatible Cementitious Dental Compositions.
Patent,
G. M. Brauer, and J. W. Stansbury. Filed 23 Feb 84, patented 4 Dec 84, 22p PB85-141794, PAT-APPL-6-582 759
Supersedes PB84-200179.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $1.00.

Dental cements with syringate esters such as 2-ethylhexyl syringate with or without vanillate esters dissolved in o-ethoxybenzoic acid as ingredients of the liquid when mixed with metal oxide powder yield rapid setting, insoluble cements that have high strength, do not inhibit free radical polymerization, adhere strongly to metal, and reduce carries. Use of silanized glass filler to the powder in conjunction with the addition of monomer to the liquid gives an even stronger cement.

514,957
PB85-142685/GAR PC **A07/MF A01**
Massachusetts Inst. of Tech., Cambridge. Energy Lab.
Internal Seal for Repairing Natural Gas Mains.
Final rept.,
S. A. Cooper, L. R. Glicksman, and C. R. Peterson. Sep 84, 144p MIT/EL-84/017
Sponsored by Consolidated Edison Co. of New York, Inc., New York.

Many of the United States' older cities use cast iron pipe as a major part of their low pressure natural gas distribution systems. Most of these pipe systems were installed under city streets at least several decades ago. The pipe systems use bell and spigot joints with a lead and jute packing, see Figure 1.1, which seals the joint against leakage. The distribution systems originally carried manufactured gas, which had heavy hydrocarbon constituents that acted to keep the jute packing moist and swollen. This swelling helped to reduce the leakage rates at those joints where the lead did not provide a positive seal. As a result, system leakage was minimal. In the 1950's many American utilities switched over to natural gas. Natural gas does not have heavy hydrocarbon constituents. This lack of moisturizers allowed the jute in some joints to dry up, shrink, and deteriorate, leading to leakage at the affected joints. The result was a rapid increase in system leakage a few years after the introduction of natural gas.

11B. Ceramics, Refractories, and Glasses

514,958
AD-A149 082/0/GAR PC **A03/MF A01**
Illinois Univ. at Urbana-Champaign. Dept. of Ceramic Engineering.
Effect of Powder Characteristics on Microstructure and Properties in Alkoxide Prepared PZT Ceramics.
Final rept. 1 Dec 83-30 Nov 84,
R. C. Buchanan, and J. Boy. Dec 84, 38p Rept no. TR-10
Contract N00014-80-K-0969

Effects of coprecipitation parameters on agglomerate structure in PZT (53:47) powders prepared from butoxide precursors were studied. Results showed that differences in the agglomerate structures developed during coprecipitation persisted throughout the subsequent processing steps and the resulting sintered densities and microstructures to be correlated to the agglomerate structures. Coprecipitation parameters which most significantly affected the powder characteristics included temperature, dilution, pH, and hydrolysis rate (controlled by water concentration). Such processing parameters as powder rinsing, calcination temperature and spray-drying conditions also significantly influenced the developed microstructures. For equivalent processing conditions, most dense and uniform microstructures were developed with the softer (and smaller) agglomerate structures, achieved from an acid (pH 3.7) medium of low (3-5 vol%) solids content with rapid hydrolysis (about 32 ml water/min) and low temperature rise (10 to 15 C). Measured dielectric constants (700-1000) on the sintered PZT samples were found to increase with average grain size which typically were larger for the basic (pH 11) powders.

514,959
N85-13008/6/GAR PC **A02/MF A01**
National Aeronautics and Space Administration, Washington, DC.
Structural Changes During Milling of Aluminum Oxide Powders.
G. Ziepler. Jul 84, 15p NAS 1.15:77488, NASA-TM-77488
Contract NASW-3542
Transl. into English from Keram. Z. (West Germany), V. 33, No. 10, 1981 p 602-605. Transl. by Scientific Translation Service, Santa Barbara, CA.

The mechanical activation of four fused corundum powders and a calcined Al2O3 powder was studied. The milled powders were characterized by their structural properties, crystallite size, and lattice distortions. Structural changes during milling, detected by X-ray line broadening analysis, gave information about the enhanced activity of the powders caused by the lattice distortions and by the decreasing crystallite size during milling. The structural changes during milling, under the same milling conditions, can be quite different for the same ceramic material, but with different characteristics in the as received state.

514,960
N85-13010/2/GAR PC **A02/MF A01**
National Aeronautics and Space Administration, Washington, DC.
Reactive Sintering of SiC.
Y. W. Kim, and J. G. Lee. Jun 84, 19p
Transl. into English from J. Of the Korean Ceram. Soc. (South Korea), V. 20, No. 2, 1983 p 115-122. Transl. by Kanner (Leo) Associates, Redwood City, CA.

Investigation of the sintering processes involved in the sintering of SiC revealed a connection between the types and quantities of sintering additives or catalysts and densification, initial shrinkage, and weight loss of the sintered SiC material. By sintering processes, is meant the methods of mass transport, namely solid vapor transport and grain boundary diffusion.

514,961
N85-13045/8/GAR PC **A02/MF A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.

High-Temperature Erosion of Plasma-Sprayed, Yttria-Stabilized Zirconia in a Simulated Turbine Environment.
R. F. Hanschuh. Dec 84, 19p NAS 1.60:2406, E-2271, NASA-TP-2406
Prepared in Cooperation with Army Research and Technology Labs., Cleveland.

A series of rig calibration and high temperature tests simulating gas path seal erosion in turbine engines were performed at three impingement angles and at three downstream locations. Plasma sprayed, yttria stablized zirconia specimens were tested. Steady state erosion curves presented for 19 test specimens indicate a brittle type of material erosion despite scanning electron microscopy evidence of plastic deformation. Steady state erosion results were not sensitive to downstream location but were sensitive to impingement angle. At difference downstream locations specimen surface temperature varied from 1250 to 1600 C (2280 to 2900 F) and particle velocity varied from 260 to 320 m/s (850 to 1050 ft/s). The mass ratio of combustion products to erosive grit material was typically 240.

514,962
N85-13048/2/GAR PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Study of the Pore Structure of Ceramics Prepared by the Slip Casting Method.
I. Y. Guzman, and A. V. Dobysh. Jul 84, 7p NAS 1.15:77495, NASA-TM-77495
Contract NASW-3542
Transl. by Scientific Translation Service, Santa Barbara, CA.

The porosity of the slip cast Si3N4 is similar to that of pressed Si3N4 formed at 2500 kg/sq cm. The porosity of cast Si oxynitride is equivalent to that of samples stressed at 10,000 kg/sq cm. Crucibles formed from these materials by slip casting have high thermal shock and corrosion resistance.

514,963
PAT-APPL-6-671 539/GAR PC **A02**/MF **A01**
Department of Commerce, Washington, DC.
Process of Synthesizing Mixed BaO-TiO2 Based Powders for Ceramic Applications.
Patent Application,
J. J. Ritter, R. S. Roth, and T. Negas. Filed 15 Nov 84, 24p PB85-141752
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A process for producing any desired Ba/Ti mixture to be formulated as an amorphous solid which crystallizes at very low temperatures to yield a desired phase or phases is disclosed. The process yields products free of undesirable impurities and allows macroscopic production of certain phases in the bariatitania system, having exceptional high frequency dielectric properties, that were previously unattainable through solid-state high temperature production techniques.

514,964
PB85-855203/GAR PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Steel Pouring Ladle Liners: Refractory Service Life. 1966-February 1984 (Citations from the Metals Abstracts Data Base).
Rept. for 1966-Feb 84.
Feb 85, 172p

This bibliography contains citations concerning the properties of refractory materials used in steel pouring ladel liners with emphasis on improved service life. Mecanical and thermal properties of the refractory linings are discussed in terms of composition and casting methods. (This updated bibliography contains 343 citations, none of which are new entries to the previous edition.)

514,965
PB85-855211/GAR PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Steel Pouring Ladle Liners: Refractory Service Life. March 1984-February 1985 (Citations from the Metals Abstracts Data Base).
Rept. for Mar 84-Feb 85.
Feb 85, 34p
Supersedes PB84-861582.

This bibliography contains citations concerning the properties of refractory materials used in steel pouring ladel liners with emphasis on improved service life. Mecanical and thermal properties of the refractory linings are discussed in terms of composition and casting methods. (This updated bibliography contains 43 citations, all of which are new entries to the previous edition.)

11C. Coating, Colorants, and Finishes

514,966
PB85-151686 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Strategy for Selection of Tribological Coatings.
Final rept.,
M. B. Peterson, and A. W. Ruff. 1984, 10p
Pub. in Proceedings of Meeting of the Mechanical Failures Group (37th), Gaithersburg, MD., May 10-12, 1983, p138-147 1984.

A strategy for the selection of a tribological coating is proposed. The important factor to consider is the tribological function of the coating. The most important functions are reduction of various modes of wear, retention of lubricant in the contact area, increase of lubricant load capacity, replacement or rebuilding of contact surfaces, and modification of the coefficient of friction. Once the required function needed in an application has been defined it is then possible to select compositions and properties which will accentuate each function. Specific laboratory tests can also be performed which rank the coatings as to their ability to perform each function. Examples are given here for important tribological functions. Over the past 10 years many new developments have been made in metallic coatings to improve their utilization for tribological purposes. These include composite and alloy coatings, new application techniques, simple cost effective application techniques, and precise composition and microstructure control. Examples are given here of advances in some of these areas.

514,967
PB85-854834/GAR PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Chromate Coatings for the Protection of Aluminum and Zinc Surfaces. 1966-February 1985 (Citations from the Metals Abstracts Data Base).
Rept. for 1966-Feb 85.
Feb 85, 174p
Supersedes PB84-861418.

This bibliography contains citations concerning chromate coatings for corrosion protection of aluminum and zinc surfaces. Topics include passivation techniques, conversion coatings, testing methods, and corrosion inhibitors. (This updated bibliography contains 357 citations, 31 of which are new entries to the previous edition.)

514,968
PB85-854842/GAR PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Protective Coatings: Immersion Plating. 1966-February 1985 (Citations from the Metals Abstracts Data Base).
Rept. for 1966-Feb 85.
Feb 85, 89p
Supersedes PB84-861400.

This bibliography contains citations concerning the applications of protective coatings by chemical reduction or dipping. Included are topics dealing with both metallic and non-metallic coatings on metal or non-metal substrates. Emphasis is placed on coatings for pipes, tubing, and metal sheets. The application of ceramic coatings by this process is also discussed. (This updated bibliography contains 178 citations, 19 of which are new entries to the previous edition.)

514,969
PB85-854982/GAR PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Plasma and Flame Sprayed Coatings. 1980-February 1985 (Citations from the Engineering Index Data Base).
Rept. for 1980-Feb 85.
Feb 85, 171p
Supersedes PB84-864412.

This bibliography contains citations concerning research and applications of plasma and flame sprayed coatings. Topics include techniques, materials descriptions, and properties of specific coatings. Coatings utilized to increase wear resistance of turbine components are discussed. (This updated bibliography contains 254 citations, 52 of which are new entries to the previous edition.)

11D. Composite Materials

514,970
AD-A148 960/8/GAR PC **A04**/MF **A01**
General Electric Corporate Research and Development, Schenectady, NY.
Advanced Artificial Dielectric Materials for Millimeter Wavelength Applications.
Annual technical rept. 1 Aug 83-30 Sep 84,
I. S. Jacobs. 26 Oct 84, 54p
Contract N00014-83-C-0447

An artificial dielectric polymeric composite containing alloy particles which are oxide-coated for isolation and ferromagnetic below room temperature for packing determination, is described. Induced magnetic dipole effects are calculated and compared with measurements of complex permeability in the centimeter wavelength range. Dielectric behavior, according to various theoretical model of hetergeneous media, is explored and correlated to experimental systems. Evidence of higher-order multipole effects and packing-limit effects in random composites is presented. Several advanced preparation techniques for fine powder were initiated. (Author)

514,971
AD-A149 037/4/GAR PC **A09**/MF **A01**
Drexel Univ., Philadelphia, PA. Dept. of Mechanical Engineering and Mechanics.
Comprehensive Study on Sublaminate Crack Growth Stability and Its Effects on the Load-Carrying Capacity.
Final rept. 1 Oct 81-30 Sep 83,
A. S. D. Wang, and F. W. Crossman. Mar 84, 195p
AFOSR-TR-84-1127
Contract F49620-79-C-0206
Prepared in cooperation with Lockheed Palo Alto Research Lab., Palo Alto CA.

This report highlights the development of a unified method for the formation mechanisms of matrix-dominated cracks in a class of structural laminates that are made using unidirectionally fiber reinforced composite plies. Because of the collimated reinforcement structure exhibited in this class of laminates, the growth of an individual matrix crack is confined either in the fiber-matrix interface or in the ply-to-ply interface. The former occurs as intraply crack caused by primarily by in-ply stresses, while the latter occurs as interply crack caused by interlaminar stresses. These are the two fundamental modes exhibited in matrix cracking. Experiments using graphite-epoxy composite systems have established that matrix cracking is actually a process in which a great number of similar cracks occur during the course of loading. The multiplicity in the crack formation process stems from the existence of material flaws which distribute randomly throughout the laminate, and from the internal reinforcement structure which inhibits individual crack from growing into large proportions. When viewed at the ply level, growth of a matrix crack is essentially brittle in nature; its growth path initially follows one of the two fundamental modes. When blunted, the initial mode may turn to the other mode. Thus, the individual growth path may be considered as piece-wise self-similar.

514,972
AD-A149 039/0/GAR PC **A23**/MF **A01**
Institute for Defense Analyses, Alexandria, VA.

Proceedings of Colloquium/Workshop on Composite Materials and Structures, Standardization, Qualification, Certification Held at Washington, DC on 8-10 May 1984.
Final rept. Jan-Jun 84,
S. L. Channon. Jul 84, 533p Rept no. IDA-D-70
Contract MDA903-84-C-0031

The Colloquium/Workshop was organized as a three day program, the first day being devoted to a series of short overviews from Government, industry and standards organizations. The second day was devoted to discussions in four separate working groups covering the following topics: Fibers and Reinforcements, Matrix Materials, Intermediate Products, and Components and Structures. On the third day, summaries of the working group discussions and recommendations were presented in a general session, followed by a period of open discussion. This document contains the presentations by individual speakers and the summary reports by the Working Group Chairmen. Originator-supplied keywords include: Composites, Standards, Qualification, Certification, Specifications, Testing, Handbook, Carbon, Aramid, and Metal Matrix.

514,973
N85-12941/9/GAR PC **A17/MF A01**
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
Tough Composite Materials.
L. F. Vosteen, N. J. Johnson, and L. A. Teichman. Dec 84, 379p NAS 1.55:2334, L-15857, NASA-CP-2334
Workshop Held in Hampton, VA., 24-26 May 1983.

No abstract available.

514,974
N85-12966/8/GAR PC **A08/MF A01**
Rensselaer Polytechnic Inst., Troy, NY.
Composite Structural Materials.
Semiannual Progress Report, 30 Sep. 1983 - 30 Apr. 1984.
G. S. Ansell, R. G. Loewy, and S. E. Wiberly. Aug 84, 174p NAS 1.26:174077, SAPR-46, NASA-CR-174077
Contract NGL-33-018-003
Sponsored in Cooperation with AFOSR.

No abstract available.

514,975
N85-12979/9/GAR PC **A04/MF A01**
Avions Marcel Dassault-Breguet Aviation, Saint-Cloud (France).
Essai 17.208: Statistique sur les Caracteristics de Base des Composites Carbone-Epoxy (Traction) (Test Report No. 17.208: Statistics of the Basic Characteristics of Carbon-Epoxy Composites).
Final Report.
F. Henriot, and J. Levesque. 15 Mar 84, 57p DGT-23.426/A
Text in French.

The uniformity of the mechanical properties of cured samples of preimpregnated lots of carbon-epoxy composites was studied in order to establish correlations applicable to quality control inspection procedures. The tensile strength variation coefficient is 7.8% in preimpregnated samples, sufficient to assure minimum reception requirements.

514,976
N85-12980/7/GAR PC **A02/MF A01**
Societe Nationale Industrielle Aerospatiale, Suresnes (France). Lab. Central.
Influence de la Relaxation sur les Caracteristiques Mecaniques d'UN Composite Carbone Epoxy, Proces-Verbal No. 45.427/1 (Influence of Relaxation on the Mechanical Characteristics of a Carbon-Epoxy Composite. Report No. 45.427/1).
G. Hilaire, and B. Soulezelle. 2 Mar 84, 15p
Contract STPA-83.96.003
Text in French.

The influence of polymerization cycles on the time-temperature physical evolution of carbon-epoxy molded plates was studied. The molded bodies were curved, assymetric and formed by 8 plies of carbon-epoxy T300/5208 preimpregnated material oriented perpendicularly. The evolution of the deformation with aging was determined. No influence of the polymerization cycle is detected.

514,977
N85-12981/5/GAR PC **A04/MF A01**
Societe Nationale Industrielle Aerospatiale, Suresnes (France). Lab. Central.
Assurance Qualite des Materiaux Composites, Proces-Verbal No. 45-649/F (Quality Assurance of Composite Materials, Test Report No. 45-649/F).
13 Mar 84, 63p
Contract STPA-83.96.003
Text in French.

Characterization of preimpregnated fibers by physical chemical methods, to replace traditional mechanical tests on composites was investigated. Environmental influences on preimpregnated fibers and composites; test methods required to characterize epoxy-carbon preimpregnated materials; and the influence of the manufacturing procedures on the control parameters were examined. It is shown that control of preimpregnated control is insufficient to assure composite quality. The proposed tests, however, are helpful to characterize new products and to provide quality investigation tools.

514,978
N85-12982/3/GAR PC **A05/MF A01**
Technische Univ., Berlin (Germany, F.R.).
Preparation of Sinter-Active Silicon Carbide Powders.
Final Report, Apr. 1983.
H. Landfermann, and H. Hausner. Sep 84, 83p
BMFT-FB-T-84-189
In German; English Summary. Sponsored by Bundesministerium fuer Forschung und Technologie.

The sintering behavior of alpha silicon carbide was investigated. Shrinkage was determined during the various sintering stages in relation to the sintering additive. The influence of the additives on densification was analyzed via the microstructural development; the sintering additive was incorporated into the body to be sintered by different methods. During the effort to optimize the material properties, defined quantities of impurities were added and their maximum limit was determined with regard to densification. Processing steps were investigated to obtain a material with a small grain size.

514,979
N85-13049/0/GAR PC **A03/MF A01**
Avions Marcel Dassault-Breguet Aviation, Saint-Cloud (France).
Essai 17.202: Caracterisation de Resine Polyimide (Polyimide Resin Characteristics, Test).
Final Report.
H. Mayer. 30 Jan 84, 35p DGT-24.322, REPT-17.202
Text in French.

The physical, chemical, and mechanical properties of polyimide preimpregnated carbon fiber molded bodies were studied in order to assess the convenience of substitution of epoxy resin preimpregnated materials. The study includes viscoelastic analysis of the polymerization cycle, molding procedures and mechanical properties measurement. An improvement is found in hot environments after aging, but the advantages do not justify the substitution of the epoxy resins.

514,980
PB85-137743/GAR PC **E03/MF E01**
Plymouth Polytechnic (England).
New Theoretical Approach to the Strength of Fibre Composite Hybrid Materials,
D. Short, and J. Summerscales. Nov 82, 23p

A fiber composite hybrid material generally consists of two or more fiber types contained in a single matrix. There are several equations already in existence which allow the calculation of the strength of the resulting composite. However, the most commonly used equations assume either a sharp transition in the failure strain of the composite when the volume ratio of the two fiber species crosses a critical value of volume ratio, or that there are distinct failure strains for each of the two fiber species. In the new theory it is assumed that the failure strain of the low elongation component can be linearly increased to the failure of the high elongation component in a manner predicted by the rule-of-mixtures. The equation predicts an upper limit to strength which may show the 'hybrid effect', a synergistic strengthening of the composite properties, subject to the correct choice of constituents for the hybrid.

514,981
PB85-138360/GAR PC **E04/MF E04**
National Physical Lab., Teddington (England). Div. of Material Applications.
Prediction of Long Term Strength of Glass Reinforced Plastics in Wet Environments,
J. Aveston, and J. M. Sillwood. c1984, 26p NPL-DMA-A-80

The combined effect of sustained load and aggressive environment is considered in predicting the long term strength of glass reinforced plastics (GRP). The fundamental strength/time relationship is obtained using thin impregnated strands, which reach rapid equilibrium with the environment - water in this case. These data are then combined with diffusion data for a similar system to obtain an expression for the long term wet strength of bulk GRP. (Copyright (c) Crown Copyright 1984.)

514,982
PB85-141588/GAR PC **E04/MF E04**
Office National d'Etudes et de Recherches Aerospatiales, Chatillon-sous-Bagneux (France).
Interaction Fatigue - Fluage dans les Composites Carbone/Resine + or - 45 degrees (Interaction Fatigue - Creep in Carbon/Resin Compounds + or - 45 degrees),
J. P. Favre, P. Sigety, and C. Marais. Mar 84, 61p
TR-40/7086/M
Text in French. Sponsored by Centre de Documentation de l'Armement, Paris (France). Direction des Recherches, Etudes et Techniques.

By applying different types of tests, an attempt has been made to connect the matrix characteristics with the fatigue content of the composite. The configuration selected for the materials is a symmetrical piling up of 8 layers at plus or minus 45 degrees, constituted of carbon T 300 fibers associated, respectively, with the Narmco 5208 resin and the CIBA 914 resin.

514,983
PB85-854818/GAR PC **N01/MF N01**
National Technical Information Service, Springfield, VA.
Nondestructive Testing of Composite Materials. 1970-February 1985 (Citations from the NTIS Data Base).
Rept. for 1970-Feb 85.
Feb 85, 200p
Supersedes PB84-860808.

This bibliography contains citations concerning the nondestructive techiques for testing or examining a wide variety of composite materials. Topics discuss the detection of flaws or defects which affect the mechanical properties and behavior of composite materials. (This updated bibliography contains 215 citations, 21 of which are new entries to the previous edition.)

11E. Fibers and Textiles

514,984
AD-A149 057/2/GAR PC **A02/MF A01**
Defence Research Establishment, Ottawa (Ontario).
Comparison of Nomex and Evolution 3 for Use in Tent Liners.
Technical note,
B. Cain. Dec 83, 19p Rept no. DREO-TN-83-31
Abstract in French.

The fabrics Nomex and Evolution 3 were examined and their physical properties relevant to use in tent liners were compared. In general, Nomex was found to be superior to Evolution 3 for use in tent liners. The Nomex samples were lighter, less voluminous, stronger, more flame retardent, and had a lower water-vapour resistance than the Evolution 3 samples. Evolution 3 absorbed less water than did Nomex. The poor flammability properties of the Evolution 3 was its principal defect. The insulating benefits of tent liners made of either material were found to be comparable. Originator-supplied keywords include: Material properties, Strength, and Thermal resistance.

11F. Metallurgy and Metallography

514,985

AD-A149 016/8/GAR PC **A04/MF A01**
NDT Technologies, Inc., South Windsor, CT.
Electromagnetic Inspection of Wire Ropes Using Sensor Arrays.
Annual summary rept. 16 Jun 83-15 Jun 84,
H. R. Weischedel. 5 Nov 84, 61p
Contract N00014-83-C-0484

We developed a new quantitative procedure and instrumentation for the inspection of wire ropes. To gain a better understanding of the instrument performance, we undertook an experimental investigation of the magnetic flux patterns inside the instrument and wire rope. Using an IBM Personnel Computer in combination with appropriate interface hardware, we implemented computer-aided defect identification methods. These methods are presently being improved and extended. We performed first experiments to implement methods for the inspection of wire rope end sections, close to the rope terminations. These experiments indicate that an instrument of this type is feasible. A prototype is presently being implemented. We delivered twelve small instruments of the new design to the US Navy. They are presently being successfully used by various Navy personnel. Additional instruments of the new design were sold to the Mine Safety and Health Administration, the Scripps Institute of Oceanography, the University of Rhode Island, the British National Coal Board, and the Kone Elevator Company.

514,986

DE84770478/GAR PC **A02/MF A01**
Duerr Anlagenbau G.m.b.H., Stuttgart (Germany, F.R.).
Combustion of Industrial Waste Gases, Residual and Waste Liquids and Fluids.
E. Vick. 1984, 23p NP-4770478
In German.
U.S. Sales Only.

Various facilities are demonstrated for thermal exhaust-air purification without additional combustion air along with combustion facilities for waste gases, residual and waste fluids and liquids which either contain or develop corrosive materials. A survey is given on the types of waste materials to be treated concerning their treatment in combustion chambers, burners and the down-stream purification system. (ERA citation 10:001066)

514,987

DE85001071/GAR PC **A03/MF A01**
Hanford Engineering Development Lab., Richland, WA.
Design and Use of Nonstandard Tensile Specimens for Irradiated Materials Testing.
N. F. Panayotou. Oct 84, 45p HEDL-SA-2984-FP, CONF-8410158-1
Contract AC06-76FF02170
Symposium on the use of nonstandard subsized specimens for irradiated testing, Albuquerque, NM, USA, 2 Oct 1984.
Portions are illegible in microfiche products.

Miniature, nonstandard, tensile-type specimens have been developed for use in radiation effects experiments at high energy neutron sources where the useful radiation volume is as small as a few cubic centimeters. The end result of our development is a sheet-type specimen, 12.7 mm long with a 5.1 mm long, 1.0 mm wide gage section, which is typically fabricated from 0.25 mm thick sheet stock by a punching technique. Despite this miniature geometry, it has been determined that the data obtained using these miniature specimens are in good agreement with data obtained using much larger specimens. This finding indicates that miniature tensile specimen data may by used for engineering design purposes. Furthermore, it is clear that miniature tensile specimen technology is applicable to fields other than the study of radiation effects. This paper describes the miniature specimen technology which was developed and compares the data obtained from these miniature specimens to data obtained from much larger specimens. 9 figures. (ERA citation 10:003037)

514,988

DE85001550/GAR PC **A02/MF A01**
Oak Ridge National Lab., TN.
Direct Comparison of Unloading Compliance and Potential Drop Techniques in J-Integral Testing.
J. J. McGowan, and R. K. Nanstad. 1984, 6p CONF-8411104-1
Contract AC05-84OR21400
Fall conference of the Society for Experimental Mechanics, Milwaukee, WI, USA, 4 Nov 1984.
Portions are illegible in microfiche products.

Single-specimen J-integral testing is performed commonly with the unloading compliance technique. Use of modern instrumentation techniques and powerful desktop computers have made this technique a standard. However, this testing technique is slow and tedious, with the loading rate fixed at a slow quasi-static rate. For these reasons the dc potential drop technique was investigated for crack length measurement during a J-integral test. For direct comparison, both unloading compliance and potential drop were used simultaneously during a J-integral test. The results showed good agreement between the techniques. However, the potential drop technique showed an offset in crack length due to plastic blunting processes. Taking this offset into account, J/sub Ic/ values calculated by both techniques compared well. (ERA citation 09:050409)

514,989

NUREG/CR-3728/GAR PC **A02/MF A01**
Oak Ridge National Lab., TN.
Effect of Temperature on the Stress-Relaxation Response of a Pressure Vessel Steel.
Topical rept.,
G. M. Goodwin, and R. K. Nanstad. Oct 84, 19p ORNL/TM-9149
Contract DE-AC05-84OR21400

Extensive cracking in the steam generator shells at Indian Point Station Unit 3 led to questions as to the effectiveness of the postweld heat treatment (PWHT) used during fabrication. A literature review revealed an absence of stress-relaxation data for the steels of interest, SA-302, grade B, and SA-533, grade B. The investigation was undertaken to characterize the stress-relaxation response at various PWHT temperatures and to determine the correlation, if any, with other measurable properties, such as hardness. A novel technique utilizing a closed-loop thermal-mechanical simulator, the Gleeble 1500, was developed and used. After producing a microstructure typical of a portion of the heat-affected zone (HAZ) of a weldment, the authors tested stress relaxation at eight temperatures, 482, 510, 538, 566, 593, 621, 649, and 677C (900, 950, 1000, 1050, 1100, 1150, 1200, and 1250F). The authors determined that 20 min (1200 s) was an adequate test time and that the magnitude of stress measured agreed with limited literature data for comparable materials. Substantial stress relaxation was noted at 593C (1100F) and above. Post-test hardness correlated very well with relaxation data.

514,990

NUREG/CR-3918/GAR PC **A04/MF A01**
Battelle Pacific Northwest Labs., Richland, WA.
Evaluation of Welded and Repair-Welded Stainless Steel for Light Water Reactor (LWR) Service: Compositional Effects on the Sensitization of Austenitic Stainless Steels.
Rept. for Jan-Sep 84,
S. M. Bruemmer, L. A. Charlot, and D. G. Atteridge. Dec 84, 73p PNL-5186

The report reviews the effects of alloying and impurity elements on the sensitization propensity of Types 304 and 316 stainless steel. As expected, carbon was found to be the dominant element controlling sensitization, with chromium, molybdenum, and nickel also important. Other alloying elements, such as manganese and silicon, have at most only a small effect on sensitization. However, strongly segregating elements, such as nitrogen, boron, and phosphorus, may have a significant effect on intergranular corrosion and stress corrosion cracking susceptibility.

514,991

NUREG/CR-4031/GAR PC **A04/MF A01**
Oak Ridge National Lab., TN.
Neutron Spectral Characterization for the Fifth Heavy Section Steel Technology (HSST) Irradiation Series. Simulator Experiments.
Topical rept.,
C. A. Baldwin, F. B. K. Kam, and F. W. Stallmann. Dec 84, 60p ORNL/TM-9423
Contract DE-AC05-84OR21400

Three neutron dosimetry experiments were performed at the Oak Ridge research Reactor Poolside Facility to study the feasibility of using the facility for the Fifth Nuclear Regulatory Commission Heavy Section Steel Technology Metallurgical Irradiations. The first two experiments revealed the original experimental configuration to be inadequate because the fluence rates estimated from the measured saturation activities were too low. In response to this, the core loading was changed and the entire experimental facility was moved closer to the core. A third experiment was performed and the resulting saturation activities and fluence rate estimates increased by approximately 40% at the points of interest. The latter fluence rate estimates were considered satisfactory, so no further changes were necessary. This report describes the three characterization experiments in detail and gives all measurement results. An analysis of the results with regard to consistency and measurement uncertainty is also presented. It is shown that the experimental results are consistent within uncertainty bounds.

514,992

N85-13006/0/GAR PC **A02/MF A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Effect of Humidity on Fretting Wear of Several Pure Metals.
H. Goto, and D. H. Buckley. Dec 84, 12p NAS 1.60:2403, E-2184, NASA-TP-2403

Fretting wear experiments with several pure metals were conducted in air at various relative humidity levels. The materials used were iron, aluminum, copper, silver, chromium, titanium, and nickel. Each pure metal had a maximum fretting wear volume at a specific humidity level RH sub max that was not dependent on mechanical factors such as contact load, fretting amplitude, and frequency in the ranges studied. The weight loss due to fretting wear at RH sub max for each pure metal decreased with increasing heat of oxygen adsorption on the metal, indicating that adhesive wear dominated at RH sub max.

514,993

N85-13036/7/GAR PC **A03/MF A01**
Leitz (Ernst) G.m.b.H., Wetzlar (Germany, F.R.)
Ion Contrasting Chamber for Discrimination of Grains and Textures.
Final Report, Dec. 1980.
D. Kossel. Jul 84, 49p BMFT-FB-T-84-151
In German; English Summary. Sponsored by Bundesministerium fuer Forschung und Technologie.

For the discrimination of grains and textures under microscopic examination, a method to contrast alloys and compounds by weakly-absorbing interference layers was developed. For the deposition of the layers a sputtering technique was used. A minimal set of layers (lead oxide, iron oxide, platinum oxide) allows the effective contrasting of metallographic textures. The optical constants of weakly-absorbing layers being unsteady the method is not suitable for the determination of ns and ks values of the substrate phase.

514,994

N85-13037/5/GAR PC **A02/MF A01**
Centre Technique des Industries Mecaniques, Senlis (France).
Corrosions des Laitons de Robinetterie (Corrosion of Brass in Potable Water Service).
Final Report.
M. A. Laroche, and B. Sutter. Sep 83, 22p CETIM-100390
Text in French.

Dezincification and stress corrosion of water pipes are discussed. Loss of zinc is reduced by using one phase brass with addition of arsenic, antimony or phosphorus. Corrosion resistance dependance on chemical composition is discussed. Corrosion tests are reviewed. Ways to reduce corrosion are examined.

514,995

N85-13038/3/GAR PC **A03/MF A01**
DECHEMA, Frankfurt am Main (Germany, F.R.).

Interactions Between Corrosion and Creep of Uncoated and Coated Superalloys in Sulfate Melts.
European Concerted Action: COST 50 - Materials for Gas Turbines, Project 3-D2. Final Report.
W. T. Wu, A. Rahmel, and M. Schorr. 1983, 40p

Electrochemical corrosion measurements with Pt-containing (LDC-2) and Pt-free Al-diffusion coatings in the (Na, K)2 SO4 melt at 1173 K are summarized. The Pt-containing coating type exhibits a broader passive range than the Pt-free type. The Pt-free type corrodes significantly faster in the passive range than the Pt-containing type. The breakthrough potential for acidic fluxing is similar for both types. The Pt-containing type has a significantly higher resistance to basic fluxing. The breakthrough potential is 300 mV more negative than that of the Pt-free type. Creep tests with IN 939 in the (Na2, Mg, Ca) SO4 melt under potentiostatic control at 1073 K show that potential affects creep behavior, due to a reduction of the load bearing cross section due to corrosion.

514,996
N85-13039/1/GAR PC **A09**/MF **A01**
Vacuumschmelze G.m.b.H., Hanau (Germany, F.R.).
Development of Rapidly Quenched Alloys with Special Physical Properties and of Processes for Their Continuous Production.
Final Report, Dec. 1982.
S. Hock, and R. Hilzinger. Sep 84, 184p BMFT-FB-T-84-179
In German; English Summary. Sponsored by Bundesministerium fuer Forschung und Technologie.

The influence of the process parameters for continuous casting techniques used to produce thin metal strips directly from the melt was evaluated. Routine production of amorphous strips with constant geometrical quality and reproducible properties was established. Processes used to coil the strips during casting are discussed. The mechanical properties of amorphous Ni-based alloys are presented as a function of alloy composition and subsequent treatment. Techniques for joining and subsequent manufacturing of amorphous alloys are pointed out.

514,997
N85-13264/5/GAR PC **A03**/MF **A01**
Houston Univ., TX.
Nondestructive Evaluation of Residual Stress in Low-Carbon Steel.
Final Report.
K. Salama. Oct 84, 26p NAS 1.26:174157, NASA-CR-174157
Contract NAG1-388

No abstract available.

514,998
PB85-137966/GAR PC**$30.00**/MF**$30.00**
BNF Metals Technology Centre, Wantage (England).
Copper-Nickel and Copper-Nickel-Iron. Applications and Corrosion.
c1983, 101p BNF/BIB-1007

Contents:
Applications of copper nickel and copper nickel iron alloys;
Corrosion in saline water;
Corrosion by chlorides other than NaCl;
Corrosion by ammonia;
Corrosion by fresh water;
Corrosion:
other sources and corrosion testing;
and BNF metals technology centre. (Copyright (c) BNF Metals Technology Centre 1983.)

514,999
PB85-139335/GAR PC **E04**/MF **E04**
Centre d'Etude de l'Energie Nucleaire, Mol (Belgium).
Tensile and Creep Properties of DT2906: Dispersion-Strengthened Ferritic Steel Tubes,
W. Vandermeulen, and W. Hendrix. Aug 84, 47p BLG-570
Summaries in French and Dutch.

This report contains results from tension, axial creep and internal pressure creep tests on tubes from several powder batches of the alloy DT2906 prepared in the laboratory of the S C K/C E N and in a pilot plant.

515,000
PB85-139640/GAR PC **E04**/MF **E04**
National Engineering Lab., East Kilbride (Scotland).
Effect of Hydrostatic Pressure on the Tensile Properties of Alpha Uranium,
E. F. Chandler. c1984, 32p NEL-693

The report examines the effect of a superimposed hydrostatic pressure on the tensile properties of four grades of rolled unalloyed alpha uranium. The materials varied in carbon content and heat treatment. The principal effect of increasing pressure is an increase in the ductility of the materials. By not heat treating the uranium after the rolling process, the interaction of carbon content on mechanical properties is almost nullified. (Copyright (c) Crown Copyright 1984.)

515,001
PB85-139665/GAR PC **E04**/MF **E04**
National Engineering Lab., East Kilbride (Scotland).
Creep Characterization of a Type 316 Austenitic Steel,
J. Henderson, N. Harwood, and D. Rooney. c1984, 38p NEL-691

Creep data on a Type 316 austenitic steel are presented covering a temperature range 550-675C and involving test times up to 30,000 hours. The data have been used to investigate the efficiency of traditional and recent methods of presenting creep data, the formulation of creep constitutive equations, and the validity of certain parametric relationships designed to aid extrapolation. The report introduces a form of the steel which will subsequently appear in the study of multiaxial stress/creep relationships and the development of a design method for creep conditions. (Copyright (c) Crown Copyright 1984.)

515,002
PB85-139830/GAR PC **E03**/MF **E03**
Oxford Univ. (England). Dept. of Engineering Science.
Effect of Strain Rate and Temperature on the Tensile Behaviour of Uranium 2 (sup w)/o Molybenum,
J. Harding, and G. A. C. Boyd. 1980, 22p OUEL-1309/80

The report describes the uniaxial tensile behavior of Uranium 2w/o Molybdenum alloy over a wide range of temperature and strain rate. Specimen blanks taken from co-reduced and extruded U2w/o Mo rods were given one of two heat treatments. Longitudinal tensile test pieces, taken form these blanks at near surface locations were tested in the temperature range -150C to +100C at strain rates from quasistatic (0.0001/s) to 1000/s. To achieve this range of testing rates three machines were required: an Instron screw driven machine for rates up to 0.1/s, a second specially constructed hydraulic machine for the range 0.1/s to 50/s and a drop weight machine for the highest strain rates. The ways in which the mechanical properties - elongation to fracture, flow stresses and ultimate tensile stress - vary with both temperature and strain rate are presented and discussed for material in both heat treatment conditions.

515,003
PB85-140028/GAR PC**$30.00**/MF**$30.00**
BNF Metals Technology Centre, Wantage (England).
Copper Nickel and Copper Nickel Iron: Properties and Processing.
c1983, 112p BNF/BIB-1009

Contents: Analysis; Casting; Coating; Heat treatment; Mechanical properties; Oxidation; Physical properties; Powder metallurgy; Structure; Surface treatment; Welding and joining operations; Working and machining operations; and BNF metals technology center.

515,004
PB85-140614/GAR PC**$30.00**/MF**$30.00**
BNF Metals Technology Centre, Wantage (England).
Continuous Casting of Copper and It's Alloys.
c1984, 109p BNF/BIB-1010

The bibliography includes billets, ingots, slabs, rod, wire, sheets, strip and tubes.

515,005
PB85-145043/GAR PC **E03**/MF **E01**
United Nations Industrial Development Organization, Vienna (Austria).
Waste Water Pollution Management and Control in the Petrochemical and Plastics Processing Industry,
A. Margola. 18 Sep 84, 21p UNIDO-ID/WG.430/4, V-84-91040

UNIDO pub on recycling of tin in tin plate plants (1) sources of tin losses through industrial wastes; economic aspects and raw material availability (2) recovery processes (3) experience of a metallurgy laboratory in Jamshedpur, India. Conclusions, bibliography. Additional reference: electrolysis, scruff, slag, sludge, anode slime, metal scrap.

515,006
PB85-145068/GAR PC **E04**/MF **E04**
Societe Nationale Industrielle Aerospatiale, Suresnes (France). Lab. Central.
Perfectionnement des Lois de Fissuration par Fatigue sous Chargement Complexe (Perfecting the Fatigue Cracking Laws under Complex Loads),
G. Hilaire, and D. Aliaga. 4 Sep 84, 49p PROCES-VERBAL-43/946/F
Text in French. Sponsored in Centre de Documentation de l'Armement, Paris (France). Direction des Recherches, Etudes et Techniques.

This study concerns the effect of individual or multiple overloads on thin sheets of the 2124 T 351 alloy. Its objective is to contribute to establishing a model for the advance of cracking under the load spectrum. The results obtained show that the retardation effect produced by multiple overloads is comparable to that encountered with realistic overloads. A single law based on the effective Delta K concept associated to a simple rule for choosing the opening point allows us to interpret the retardation effects found on loads of increasing complexity. In addition, these studies should be complemented by a study the effect of overloads in thick sheets with curvilinear-front cracks has. These latter studies are being undertaken by the UTC.

515,007
PB85-145084/GAR PC **E03**/MF **E01**
United Nations Industrial Development Organization, Vienna (Austria).
Recovery and Recycling of Tin in Tinplate Plant,
V. A. Altekar. 23 Aug 84, 19p UNIDO/ID/WG.428/1, V-84-89448

The tinplate scrap, when arising either as cutting and clippings and defective sheets in the manufacture of tinplate itself or during the making of can and containers, is available in loosely packed bundles. In the case of the Tinplate Company of India Limited, Jamshedpur, they supply the rejects and cuttings in rectangular bundles of coils 50 kgs each measuring approximately 75 x 50 x 50 cm. As such, these can be directly put in the electrolytic tank as anodes. For the used cans and containers, pretreatment like removal of paints and enamels and shredding may be necessary. However, the overall recovery of tin in the form of metal and as compounds like sodium stannate, tin oxide etc. recoverable from the electrolyte, and also the recovery of clean detinned steel scrap, have bright prospect and the extent of profitability of such recovery on large and organized scale in developing countries like India may be examined by preparing detailed project report. The same is also true of incorporating recovery units for processing of sludges, scruff and slags which can yield the tin values and boost up the sagging economy of tinplate industry.

515,008
PB85-854859/GAR PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
High Temperture, High Wear Resistant Solid Lubricants. April 1983-February 1985 (Citations from FLUIDEX Data Base).
Rept. for Apr 83-Feb 85.
Feb 85, 84p
Supersedes PB84-861475.

This bibliography contains citations concerning solid lubricants for high wear and high temperature resistant surfaces. Emphasis is on molybdenum disulfide; however, gold-molybenum alloys and polysiloxanes are also discussed. Methods for depositing thin film solid lubricants including sputtering and electrodeposition, are considered. The corrosion properties of the solid lubricant-metal interface are also included. (This updated bibliography contains 135 citations, 23 of which are new entries to the previous edition.)

515,009
PB85-855070/GAR PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.

Hard Facing Alloys. 1970-February 1985 (Citations from the Engineering Index Data Base).
Rept. for 1970-Feb 85.
Feb 85, 162p
Supersedes PB84-862424.

This bibliography contains citations concerning hard facing alloys, including practices and applications. The wear and impact resistance of hard surfacing alloys and deposition techniques are considered. Automatic application methods are discussed as ways to lower repair costs. Hard facing methods considered include submerged arc, plasma spray, consumable and non-consumable electrode, flame spray, electric spray alloying, and carbon dioxide laser hard facing. Iron and nickel base alloys are considered as replacements for cobalt based alloys. (This updated bibliography contains 261 citations, 16 of which are new entries to the previous edition.)

11I. Plastics

515,010

AD-A149 062/2/GAR PC **A03**/MF **A01**
Cornell Univ., Ithaca, NY. Dept. of Materials Science and Engineering.
Gel Drawn Fibers of Poly(Vinyl Alcohol).
Technical rept.,
P. Cebe, and D. T. Grubb. 3 Jan 85, 44p Rept no. TR-2
Contract N00014-83-K-0471

Semi-crystalline gels of several samples of poly(vinyl alcohol) were made from solutions in which the polymer concentration varied from 2.0 to 15.0%. Entanglement density in the material was in this way reduced from the melt entanglement density. When gels were partially dried and drawn isothermally the maximum draw ratio increased with drawing temperature up to 11-14 at 140-180 C. A melt cast film could be drawn to 6.8 times at 140 C. Drawn material had a crystallinity of 55-80%, while that of isotropic material was 20-55%. Gels of lower initial concentration (lower entanglement density) could be drawn to greater extensions at a given draw temperature and had better mechanical properties. Young's modulus increased with draw ratio to values very close to those for polyethylene fibers drawn by the same amount. Young's modulus was independent of drawing temperature or degree of crystallinity but on comparing drawn gels of the same draw ratio, crystallinity and crystalline orientation, those of lower entanglement density had higher Youngs modulus. (Author)

515,011

DE84013039/GAR PC **A03**/MF **A01**
Solar Energy Research Inst., Golden, CO.
Effect of Ultraviolet Radiation on Transparent Polymer Films as Determined Using In Situ FTIR-RA Spectroscopy. Volume I. Photodegradation of Transparent Polymer Films.
J. D. Webb. Aug 84, 43p SERI/TR-255-2177-V.1
Contract AC02-83CH10093
Portions are illegible in microfiche products. Original copy available until stock is exhausted.

This report demonstrates the application of Fourier transform infrared reflection-absorption (FTIR-RA) spectroscopy to the in-situ study of the effects of ultraviolet radiation on polymeric materials proposed for use in passive solar heating and cooling systems. The method permits collection of the infrared reflection-absorption spectrum of a polymer film on an IR-reflective substrate while the sample is exposed to simulated outdoor conditions. Preliminary studies of two materials (polycarbonate and poly(methyl methacrylate)) having potential for glazing applications are described. Qualitative information on photodegradation reaction mechanisms was obtained, and quantum yields for some reactions were determined and shown to be comparable to literature values. (ERA citation 10:002168)

515,012

NUREG/CR-3898/GAR PC **A06**/MF **A01**
Brookhaven National Lab., Upton, NY.
Evaluation of the Effects of Gamma Irradiation on the Mechanical Properties of High Density Polyethylene,
D. R. Dougherty, J. W. Adams, and R. E. Barletta.
Dec 84, 102p BNL-NUREG-51802

Mechanical tests following gamma irradiation and creep tests during irradiation have been conducted on high-density polyethylene (HDPE) to assess the adequacy of this material for use in high-integrity containers (HICs). Two types of HDPE, a highly cross-linked rotationally-molded material and a non-cross-linked blow molded material, were used in these tests. Gamma-ray irradiations were performed at several dose rates in environments of air, Barnwell and Hanford backfill soils, and ion-exchange resins. The results of tensile and bend testing on these materials following irradiation at 10-11C showed no effects directly or solely attributable to radiation-induced oxidation. However, effects due to radiation-induced cross-linking, including an increase in yield strength and decreases in both elongation at yield and elongation at break, were observed.

515,013

N85-13062/3/GAR PC **A02**/MF **A01**
Societe Nationale Industrielle Aerospatiale, Les Mureaux (France).
Optimisation de l'Injection des Thermoplastiques Thermostables Peek Renforces de Fibres Courtes de Carbone (Optimization of the Injection Process for Thermostatic Polyether-Ether-Ketone (Peek) Thermoplastics Reinforced with Short Carbon Fibers).
P. Hornet, K. Stocklin, and J. P. Spigolis. 1984, 3p
SNIAS-842-422-102
Text in French. Presented at Carbone 1984, 2-6 Jul. 1984.

The injection parameters of polyether-ether-ketone (PEEK) reinforced with 30% carbon fibers were studied, to determine the effects on the characteristics of molded products. Injection pressure, injection velocity, mold temperature and hold pressure were examined. The effects on 11 physical or mechanical properties were examined. It is shown that lower temperatures and holding pressures minimize the thermal expansion. Lower cooling velocities have a positive influence on the temperature dependent mechanical properties.

515,014

PB85-144194/GAR PC **E11**/MF **E11**
Plastics and Rubber Inst., London (England).
Radiation Processing for Plastics and Rubber 2. International Conference Held at University of Kent at Canterbury on 28-30 March 1984.
Mar 84, 237p

This conference discusses the scientific, processing, and different fields of applications such as grafting, medical, as well as general.

515,015

PB85-152833/GAR PC **A02**/MF **A01**
Brown Univ., Providence, RI.
Basic Research on Macromolecular Dynamics.
Annual rept. 1 Jun 83-31 May 84,
J. H. Weiner. Jun 84, 15p GRI-84/0122
Contract GRI-5082-260-0658
See also PB84-123538.

The purpose of this report is to gain an increased understanding of the mechanical behavior of plastics by the investigation of the dynamics of macromolecules on the atomic level. The widespread use of plastic pipe for gas distribution dictates the need for obtaining as thorough an understanding of the mechanical vehavior of plastics as possible in order to maximize safety and economy. This behavior can be studied on various levels: (a) the macroscopic scale, in which the plastic is regarded as a homogeneous continuum, (b) the microscopic scale, in which crystalline and non-crystalline regions are distinguished, and (c) the atomic scale, treating individual long-chain molecules. Studies on the various levels are mutually complimentary. This program deals with the atomic level.

515,016

PB85-855005/GAR PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Plastics and Elastomers: Space Applications. 1977-January 1985 (Citations from the Rubber and Plastics Research Association Data Base).
Rept. for 1977-Jan 85.
Jan 85, 131p
Supersedes PB84-859313.

This bibliography contains citations concerning thermoplastic and thermosetting resins utilized for space environments. Among the properties examined for selected polymers are ultraviolet light sensitivity, radiation resistivity, sensitivity to extreme temperatures, adhesion qualities, strength, and insulation value. Fiber reinforced plastics, nylon, vinyl, cellular plastics, epoxy resin, PTFE, and elastomers are among the polymers and adhesive resins described with reference to manufacturers, tradenames, marketing trends, performance results, and specific applications. (This updated bibliography contains 205 citations, 40 of which are new entries to the previous edition.)

11J. Rubbers

515,017

AD-A148 993/9/GAR PC **A02**/MF **A01**
Lehigh Univ., Bethlehem, PA. Coxe Lab.
Characterization of Novel Binders Based on Energetic Thermoplastic Elastomers.
Rept. for 1 Oct 83-30 Sep 84,
L. H. Sperling. 30 Sep 84, 6p
Contract N00014-82-K-0050

Beginning in the fall of 1981, a research program was undertaken to develop a series of block copolymers based on novel polyethers. This research is part of the Low Vulnerability Ammunition, LOVA, program of the Office of Naval Research. The principal polymers of interest in this program are the crystalline polyBEMO and polyBAMO, and their thermoplastic elastomers. The most important findings of the past year are: PolyBEMO decomposes endothermally at elevated temperatures, meeting an important LOVA objective of safer compositions; The use temperatures of polyBEMO, polyBAMO, and their block copolymers range from -30 to +75 C. The modulus of the block copolymers is leathery to rubbery, depending on the composition; Processing can be carried out in the range of 80-110 C; and PolyBEMO and polyBAMO are highly crystalline materials. PolyBEMO exhibits more than one crystalline form. Major focus of the research has been to characterize the thermal and physical behavior of these materials.

515,018

N85-13046/6/GAR PC **A04**/MF **A01**
General Electric Co., Schenectady, NY.
Toughening Mechanism in Elastomer-Modified Epoxy Resins, Part 2.
Final Report, 1 Jul. 1982 - 30 Aug. 1983.
A. F. Yee, and R. A. Pearson. Dec 84, 56p NAS 1.26:3852, REPT-84-SRD-041, NASA-CR-3852
Contract NAS1-16132

The role of matrix ductility on the toughenability and toughening mechanism of elastomer-modified DGEBRA epoxies was investigated. Matrix ductility was varied by using epoxide resins of varying epoxide monomer molecular weights. These epoxide resins were cured using 4,4' diaminodiphenyl sulfone (DDS) and, in some cases, modified with 10% HYCAR(r)CTBN 1300X8. Fracture roughness values for the neat epoxies were found to be almost independent on the monomer molecular weight of the epoxide resin used. However, it was found that the fracture toughness of the elastomer-modified epoxies was very dependent upon the epoxide monomer molecular weight. Tensile dilatometry indicated that the toughening mechanism, when present, is similar to the mechanisms found for the piperidine cured epoxies in Part 1. SEM and OM corroborate this finding. Dynamic mechanical studies were conducted to shed light on the toughenability of the epoxies. The time-dependent small strain behavior of these epoxies were separated into their bulk and shear components. The bulk component is related to brittle fracture, whereas the shear component is related to yielding. It can be shown that the rates of shear and bulk strain energy buildup for a given stress are uniquely determined by the values of Poisson's ratio, nu. It was found that nu increases as the monomer molecular weight of the epoxide resin

used increases. This increase in nu can be associated with the low temperature beta relaxation. The effect of increasing cross-link density is to shift the beta relaxation to higher temperatures and to decrease the magnitude of the beta relaxation. Thus, increasing cross-link density decreases nu and increases the tendency towards brittle fracture.

11L. Wood and Paper Products

515,019
DE85002377/GAR PC **A02/MF A01**
Battelle Pacific Northwest Labs., Richland, WA.
Pulp and Paper Industry Energy Impacts Through Implementation of Biotechnologies.
E. A. Griffin. Jun 84, 5p PNL-SA-12401, CONF-8409153-2
Contract AC06-76RL01830
TAPPI research and development conference, Appleton, WI, USA, 30 Sep 1984.
Portions are illegible in microfiche products.

Biotechnology will affect the pulp and paper industry in many areas with resultant energy savings. In the area of processing, biopulping and biobleaching reduce the energy required to remove lignin and reduce the need for bleaching chemicals. In pollution control, microbially engineered waste systems can be used in removing sulfur from coal resulting in improved energy efficiency in waste treatment processes. In forest agriculture, cloning of superior trees, the use of microbial pesticides, genetically improved nitrogen-fixing fungi will reduce the need for pesticides, herbicides, and fertilizers. 12 references, 4 tables. (ERA citation 10:002106)

12. MATHEMATICAL SCIENCES

12A. Mathematics and Statistics

515,020
AD-A148 964/0/GAR PC **A02/MF A01**
Texas Univ. at Austin. Dept. of Electrical and Computer Engineering.
Research in Adaptive and Decentralized Control.
Interim rept. 15 Mar-14 Sep 84,
S. I. Marcus. 1 Oct 84, 4p AFOSR-TR-84-1148
Grant AFOSR-84-0060

Progress has been made in a number of aspects of the proposed research areas. First, the investigators have continued to work on problems of adaptive stochastic control of queues with complete observations. The stochastic adaptive control problems solved to date have all, with the exception of those for linear systems, involved the assumption of complete (noiseless) state observations. Details are presented in this report. (Author).

515,021
AD-A148 975/6/GAR PC **A03/MF A01**
North Carolina Univ. at Chapel Hill. Dept. of Statistics.
More Limit Theory for the Sample Correlation Function of Moving Averages.
Technical rept.,
R. Davis, and S. Resnick. Sep 84, 35p TR-72, AFOSR-TR-84-1151
Contract F49620-82-C-0009, Grant NSF-DMS82-02335

This document summarizes results describing the limit laws for the sample correlation function of moving averages.

515,022
AD-A149 014/3/GAR PC **A03/MF A01**
Stanford Univ., CA. Dept. of Statistics.
W.E. Johnson's 'Sufficientness' Postulate.
Technical rept.,
S. L. Zabell. 22 Nov 84, 26p Rept no. TR-350
Contract N00014-76-C-0475

How do Bayesians justify using conjugate priors on grounds other than mathematical convenience. In the 1920's the Cambridge philosopher William Ernest Johnson in effect characterized symmetric Dirichlet priors for multinomial sampling in terms of a natural and easily assessed subjective condition. Johnson's proof can be generalized to include asymmetric Dirichlet priors and those finitely exchangeable sequences with linear posterior expectation of success. Some interesting open problems that Johnson's result raises, and its historical and philosophical background are also discussed.

515,023
AD-A149 026/7/GAR PC **A02/MF A01**
Emory Univ., Atlanta, GA. Dept. of Mathematics and Computer Science.
New Methods for Numerical Solution of One Class of Strongly Nonlinear Partial Differential Equations with Applications in Hydrodynamics.
Final rept. 1 Sep 83-31 Aug 84,
V. Oliker, and P. Waltman. Oct 84, 5p AFOSR-TR-84-1147
Grant AFOSR-83-0319

This effort studied a proposed numerical method for finding elliptic solutions of the Monge-Ampere equations, in the context of hydrodynamic and antenna design applications. Some computational experiments were performed on representative model problems. A theoretical estimate for the convergence rate of one part of the scheme was obtained. For the problem of reflector antenna design, the solvability of the corresponding linearized problem was demonstrated. A geometric interpretation of the solution was obtained which helps in understanding the problem.

515,024
AD-A149 032/5/GAR PC **A03/MF A01**
Stanford Univ., CA. Lab. for Computational Statistics.
Smoothing with Split Linear Fits,
Technical rept.,
J. A. McDonald, and A. B. Owen. Jul 84, 29p Rept no. LCS-TR-7
Contract N00014-83-K-0472

We introduce a family of smoothing algorithms that can produce discontinuous output. Unlike most commonly used smoothers, that tend to blur discontinuities in the data, this smoother can be used for smoothing with edge detection. We cite examples of other approaches to (two-dimensional) smoothing with edge detection in image processing, and apply our one-dimensional smoother to sea surface temperature data where the discontinuities arise from changes in ocean currents.

515,025
AD-A149 044/0/GAR PC **A03/MF A01**
Wisconsin Univ.-Madison. Mathematics Research Center.
Robust Kalman Filtering and Its Applications.
Technical summary rept.,
I. Guttman, and D. Pena. Oct 84, 36p Rept no. MRC-TSR-2766
Contract DAAG29-80-C-0041

This paper presents a robust Kalman filtering algorithm that is obtained assuming a scale contaminated normal distribution for the noise of the measurement equation. The mixture of normals obtained as a posterior distribution is approximated at each stage by a normal distribution with the same mean and variance. The resulting algorithm is simple, has a straightforward interpretation and seems to provide useful robust estimators in several statistical problems that are briefly reviewed. Originator-supplied keywords include: Robustness, and mixtures of normals.

515,026
AD-A149 045/7/GAR PC **A02/MF A01**
Wisconsin Univ.-Madison. Mathematics Research Center.
Note on the Disturbance Decoupling Problem for Retarded Systems.
Technical summary rept.,
R. F. Curtain, and D. Salamon. Oct 84, 12p Rept no. MRC-TSR-2762
Contract DAAG29-80-C-0041, Grant NSF-MCS82-10950
Sponsored in part by Grant NSF-DMS82-10950.

The disturbance decoupling problem for linear control systems is to design a feedback control law in such a way that the disturbances do not influence these outputs which are to be regulated. In this note we present a very simple solution to this problem for a rather general class of retarded functional differential equations with delays in the state variables. Originator-supplied keywords include: Retarded systems, and Feedback and output.

515,027
AD-A149 046/5/GAR PC **A02/MF A01**
Wisconsin Univ.-Madison. Mathematics Research Center.
Remark on Regularization in Hilbert Spaces.
Technical summary rept.,
J. M. Lasry, and P. L. Lions. Oct 84, 15p Rept no. MRC-TSR-2760
Contract DAAG29-80-C-0041

It is well-known that in finite dimensions one may regularize continuous functions (using convolution for example). The usual methods to do so fail in infinite dimensional Hilbert spaces. This document proposes a method to solve this difficulty, which is based upon explicit formula that are called inf-convolution formulas.

515,028
AD-A149 047/3/GAR PC **A03/MF A01**
Naval Postgraduate School, Monterey, CA.
Modelling and Residual Analysis of Nonlinear Auto-Regressive Time Series in Exponential Variables.
Technical rept.,
P. A. W. Lewis, and A. J. Lawrence. Aug 84, 39p Rept no. NPS55-84-019

An approach to modelling and residual analysis of nonlinear autoregressive time series in exponential variables is presented; the approach is illustrated by analysis of a long series of wind velocity data which has first been detrended and then transformed into a stationary series with an exponential marginal distribution. The stationary series is modelled with a newly developed type of second order autoregressive process with random coefficients, called the NEAR(2) model; it has a second order autoregressive correlation structure but is nonlinear because its coefficients are random. The exponential distributional assumptions involved in this model highlight a very broad four parameter structure which combines five exponential random variables into a sixth exponential random variable; other applications of this structure are briefly considered. Dependency in the NEAR(2) process not accounted for by standard autocorrelations is explored by developing a residual analysis for time series having autoregressive correlation structure; this involves defining linear uncorrelated residuals which are dependent, and then assessing this higher order dependence by standard time series computations. Application of this residual analysis to the wind velocity data illustrates both the utility and difficulty of nonlinear time series modelling.

515,029
AD-A149 049/9/GAR PC **A03/MF A01**
Naval Research Lab., Washington, DC.
Vectorization and Implementation of an Efficient Multigrid Algorithm for the Solution of Elliptic Partial Differential Equations.
Memorandum rept.,
C. R. DeVore. 31 Dec 84, 36p Rept no. NRL-MR-5504

Multilevel adaptive techniques are powerful methods for solving many types of problems in computational physics. In his analysis of multilevel methods for application to elliptic boundary-value problems, Douglas found a particularly efficient algorithm for their solution. This report describes a vectorized, finite-difference implementation of his algorithm suitable for use in large-scale computations. (Author)

515,030
AD-A149 050/7/GAR PC **A03/MF A01**
Aeronautical Research Labs., Melbourne (Australia).

Conformal Mapping Suitable for Problems Involving Interaction Between Given Geometries and Known Far Fields.
Technical memo.,
T. Tran-Cong. Sep 84, 26p Rept no. ARL-AERO-TM-367

A conformal transformation formula using Riemann-Stieltjes integrals is derived for use with problems involving the interaction between a given finite-sized geometry and a known far field. The derivative of this transformation is non-singular in the domain considered and tends to one at infinity. A formula is derived for transformation from the unit circle to the exterior of an arbitrarily given continuous curve with bounded variation. A special case of the transformation is very similar to that of Schwarz-Christoffel. Application to the generation of aerofoils gives some fairly flexible formulae of the finite product type. (Author)

515,031
AD-A149 069/7/GAR PC **A03**/MF **A01**
Wisconsin Univ.-Madison. Mathematics Research Center.
Neumann Type Boundary Conditions for Hamilton-Jacobi Equations.
Technical summary rept.,
P. L. Lyons. Oct 84, 36p Rept no. MRC-TSR-2761
Contract DAAG29-80-C-0041

In this paper, we present a notion of viscosity solutions of Hamilton-Jacobi equations for Neumann type boundary conditions (or more generally oblique derivative). In particular we prove the existence, uniqueness, stability of such solutions and we show that the vanishing viscosity method yields such solutions. Next, we check that value functions of control problems or differential games problems for reflected dynamical processes are solutions in that sense of the associated Bellman or Isaacs equations. Finally, we consider the ergodic problems.

515,032
AD-A149 079/6/GAR PC **A05**/MF **A01**
Naval Postgraduate School, Monterey, CA.
Computable Real Analysis,
B. J. MacLennan. Dec 84, 84p Rept no. NPS52-84-024

We present a model of the real numbers that is completely finitistic. Every real number is represented by a finite structure-specifically, a finite sequence of symbols from a finite alphabet. All of the arithmetic operations on reals are also finite and can be evaluated on a computer. We allow nothing that cannot be described by a finite algorithm-whether numbers or sequences or functions. This development is carried through the fundamental theorem of calculus. (Author)

515,033
AD-A149 092/9/GAR PC **A02**/MF **A01**
Wisconsin Univ.-Madison. Mathematics Research Center.
Regenerative Structure of Markov Chains Simulated via Common Random Numbers.
Technicl summary rept.,
P. W. Glynn. Oct 84, 14p Rept no. MRC-TSR-2765
Contract DAAG29-80-C-0041, Grant NSF-ECS84-04809

A standard strategy in simulation, for comparing two stochastic systems, is to use a common sequence of random numbers to drive both systems. Certain theoretical and methodological results require that the coupled system be regenerative. It is shown that if the stochastic systems are Markov chains with countable state space, then the coupled system is necessarily regenerative. An example is given which shows that the regenerative property can fail to hold in general state space, even if the individual systems are regenerative.

515,034
AD-A149 093/7/GAR PC **A03**/MF **A01**
Wisconsin Univ.-Madison. Mathematics Research Center.
Symmetry Breaking for a Class of Semi-Linear Elliptic Problems.
Technical summary rept.,
G. Cerami. Oct 84, 27p Rept no. MRC-TSR-2759
Contract DAAG29-80-C-0041

This document considers a nonlinear elliptic problem. Suppose this problem has a family of positive radial solutions parameterized by R, i.e., UR (X). This paper studies the possibility of the existence of nonradial solutions of bifurcating from the radial solutions family. Answering a question posed by Smoller and Wasserman, it is shown this happens if f satisfies suitable assumptions. Therefore, the global structure of the nonradial solution set is investigated.

515,035
AD-A149 094/5/GAR PC **A03**/MF **A01**
Wisconsin Univ.-Madison. Mathematics Research Center.
Hamilton-Jacobi Equations in Infinite Dimensions. Part 1. Uniqueness of Viscosity Solutions,
M. G. Crandall, and P. L. Lions. Nov 84, 28p Rept no. MRC-TSR-2769
Contract DAAG29-80-C-0041

The recent introduction of the theory of viscosity solutions of nonlinear first-order partial differential equations - which we will call Hamilton-Jacobi equations or HJE's here - has stimulated a very strong development of the existence and uniqueness theory of HJE's as well as a revitalization and perfection of the theory concerning the interaction between HJE's and the diverse areas in which they arise. The areas of application include the calculus of variations, control theory and differential games. This paper is the first of a series by the authors concerning the theoretical foundations of a corresponding program in infinite dimensional spaces. The basic question of what the appropriate notion of a viscosity solution should be in an infinite dimensional space is answered in spaces with the Radon-Nikodym property by observing that the finite dimensional characterization may be used essentially unchanged. Technical difficulties which arise in attempting to work with this definition because bounded continuous functions on balls in infinite dimensional spaces need not have maxima are dispatched with the aid of the variational principle which states that maxima do exist upon perturbation by an arbitrarily small linear functional.

515,036
AD-A149 095/2/GAR PC **A02**/MF **A01**
Wisconsin Univ.-Madison. Mathematics Research Center.
Controlled Approximation and a Characterization of the Local Approximation Order.
Technical summary rept.,
C. de Boor, and R. Q. Jia. Oct 84, 13p Rept no. MRC-TSR-2763
Contract DAAG29-80-C-0041

Document characteristics the local approximation order from a scale (S sub h) of approximating functions on R to the m power is characterized in terms of the linear span (and its Fourier transform) of the finitely many compactly supported functions psi. (Author)

515,037
DE85000848/GAR PC **A08**/MF **A01**
Virginia Polytechnic Inst. and State Univ., Blacksburg. Center for Transport Theory and Mathematical Physics.
Applied Mathematics of Transport Theory. Progress Report, December 1, 1983-November 30, 1984.
W. Greenberg, and P. F. Zweifel. 1984, 173p DOE/ER/10711-4
Contract AS05-80ER10711
Portions are illegible in microfiche products.

We have made substantial progress in several continuing areas of research during the past year, which we report on under the headings: (A) abstract transport theory, (B) computational analysis, (C) acceleration methods for transport iteration calculations, and (D) transport with non-normal generators. A brief review of progress during the past year is given, and the direction of current and future research is indicated. Publications are listed. (ERA citation 10:003863)

515,038
N85-13520/0/GAR PC **A03**/MF **A01**
Oxford Univ. (England).
Self-Tuning Control of Offset: A Unified Approach.
P. S. Tuffs, and D. W. Clarke. 1984, 48p OUEL-1539/84

Offset between measurement and desired value when regulating a plant subjected to constant load-disturbances about a nonzero set-point, with the controlled autoregressive integrated moving average (CARIMA) model in self tuning control is discussed. The normal ad-hoc insertion of an integrator solves the problem but can introduce others (such as convergence difficulties). One solution is to use a CARIMA plant model in which the noise term is nonstationary, and it is shown that good adaptive behavior is then possible with generalized minimum-variance and pole-placement self tuning controllers. The approach produces integral control terms in a natural way, and for simplified plant models leads directly to a general PID algorithm.

515,039
N85-13521/8/GAR PC **A03**/MF **A01**
Oxford Univ. (England).
Long-Range Predictive Control Using Weighting-Sequence Models.
D. W. Clarke, and L. Zang. 1984, 28p OUEL-1542/84

The predictive control algorithm (PCA), dynamic matrix control (DMC) and identification/command (IDCOM) process control algorithms are compared. It is shown that they are capable of providing good stable control under certain conditions. The IDCOM, however, is seen by simulations to be the least satisfactory approach. The derivations show that all the methods are capable of further refinement; in particular DMC (potentially the most robust) benefits from using a proper predictor and cost-function rather than the heuristics of the original approach. The applicability of the algorithms and the restrictions imposed by the simple assumed plant model are discussed.

515,040
N85-13528/3/GAR PC **A02**/MF **A01**
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
Generalized Formulation of TVD (Total Variation Diminution) Lax-Wendroff Schemes.
Final Report.
P. L. Roe. Oct 84, 16p NAS 1.26:172478, ICASE-84-53, NASA-CR-172478
Contract NAS1-17070

The work of Davis, which imports the concept of total variation diminution (TVD) into non-upwinded, Lax-Wendroff type schemes, is reformulated in a way which is easier to analyze. The analysis reveals a class of TVD schemes not observed by Davis. Only the case of one dimensional linear advection is treated.

515,041
N85-13529/1/GAR PC **A02**/MF **A01**
Mississippi Remote Sensing Center, Mississippi State.
Transformation of Two and Three-Dimensional Regions by Elliptic Systems.
Semiannual Status Report, 15 May - 14 Nov. 1984.
E. W. Mastin, and J. F. Thompson. 14 Dec 84, 6p
NAS 1.26:174176, NASA-CR-174176
Grant NSG-1577

The research during this period continued to expand the class of numerical algorithms that can be accurately and efficiently implemented on overlapping grids. Whereas previous calculations have been used to solve elliptic equations and to find the steady-state solution of parabolic equations, the present work is aimed towards developing time-accurate solution techniques for parabolic and hyperbolic equations. The primary difficulty here is in the correct treatment of the interior boundary nodes that must be updated at each iteration. The implementation of explicit methods is straightforward. However, the common practice of lagging these values when using an implicit methods leads to inconsistencies in the difference equation. One way to avoid this problem is to alternately calculate with an implicit and an explicit method on each subgrid. With this procedure, the explicit method generates boundary values at the next time level which are then used by the implicit step. It can be shown that when a backward implicit method is combined with a forward explicit method, the composite method is second order accurate and unconditionally stable for linear problems. A second area in which progress can be reported is in the distribution of grid points on curves and surfaces.

515,042
N85-13536/6/GAR PC **A05**/MF **A01**
Freiburg Univ. (Germany, F.R.). Inst. fuer Angewandte Mathematik.

Interval Mathematics Reports.
1984, 77p REPT-84/1
Partly in German and English.

No abstract available.

515,043
N85-13540/8/GAR PC **A02/MF A01**
Chalmers Univ. of Technology, Goeteborg (Sweden). Dept. of Mathematics.
Unrestricted Convergence for Generalized Poisson Integrals.
P. Sjoegren. 1984, 10p CTH-MATH-1984-13

A Poisson integral of L to the pth power function f on the maximal boundary of a symmetric space is discussed. For p 1, it is shown that the generalized Poisson integral of f converges unrestrictedly to f at almost every boundary point. Estimation methods of maximal functions are used.

515,044
N85-13541/6/GAR PC **A02/MF A01**
Chalmers Univ. of Technology, Goeteborg (Sweden). Dept. of Mathematics.
Measure Determining Classes of Balls in Banach Space.
U. Dinger. 1984, 17p CTH-MATH-1984-14
Submitted for Publication.

Two Borel probability measures on C(0,1) -- the Banach space of all real-valved continuous functions on 0,1 with the supremum norm -- are considered. The following point is addressed: The equality of the measures, when they agree on all balls with centers in a closed supporting linear subspace of C (0,1) and radius one. It is assumed that two Borel probability measures in a separable Banach space with the same Fourier transform must be equal.

515,045
N85-13542/4/GAR PC **A02/MF A01**
Chalmers Univ. of Technology, Goeteborg (Sweden). Dept. of Mathematics.
Interpolating Sequences for H to Infinity in the Ball.
B. Berndtsson. 1984, 19p CTH-MATH-1984-15
Submitted for Publication.

An interpolating sequence for H to infinity is given. A sequence (an) of points in the unit ball of n-dimensional space of complex numbers is said to be interpolating for H to infinity when for any sequence (bn) in the unit disk there is a bounded holomorphic function F such that F(an) and bn are equal. Sufficient conditions for a sequence discrete in the unit ball to be an interpolation sequence for H to infinity are given. The Carleson interpolation theorem is extended to the case of dimension n. This condition is not necessary.

515,046
N85-13543/2/GAR PC **A03/MF A01**
Chalmers Univ. of Technology, Goeteborg (Sweden). Dept. of Mathematics.
Time Discretization of Parabolic Problems by the Discontinuous Galerkin Method.
K. Eriksson, C. Johnson, and V. Thomee. 1984, 43p CTH-MATH-1984-16
Submitted for Publication.

The Discontinous Galerkin method for the time discretization of parabolic type problems in a general setting is analyzed. Error estimates are derived at the nodal points as well as uniformly in time for smooth and nonsmooth data. These estimates are combined with estimates for semi-discrete (in space) Galerkin approximations of parabolic problems to yield error estimates for complete discretization of such problems.

515,047
N85-13544/0/GAR PC **A03/MF A01**
Chalmers Univ. of Technology, Goeteborg (Sweden). Dept. of Mathematics.
Loeb Sobolev Spaces with Applications to Variational Integrals and Differential Equations.
L. Arkeryd. 1984, 30p CTH-MATH-1984-19
Submitted for Publication.

Spaces of the Sobolev type, but using the Loeb integral, are introduced. Solutions to relaxed variational problems and measure-valued solutions to hyperbolic problems are shown to be equivalent to solutions of the original problem in the Loeb Sobolev space. A relaxation type minimization problem on Sobolev spaces is discussed.

515,048
PB85-855054/GAR PC **N01/MF N01**
National Technical Information Service, Springfield, VA.
Kalman Filters. November 1982-February 1985 (Citations from the Engineering Index Data Base).
Rept. for Nov 82-Feb 85.
Feb 85, 117p
Supersedes PB84-862879.

This bibliography contains citations concerning the design and applications of kalman filters for flow control, air pollution control, navigation systems, radar tracking, linear and non-linear electronic systems, antenna arrays, communications, and noise measurements. (This updated bibliography contains 162 citations, 76 of which are new entries to the previous edition.)

12B. Operations Research

515,049
AD-A148 961/6/GAR PC **A02/MF A01**
Massachusetts Inst. of Tech., Cambridge. Artificial Intelligence Lab.
Collision Detection for Moving Polyhedra.
Memorandum rept.,
J. Canny. Oct 84, 19p Rept no. AI-M-806
Contracts N00014-81-K-0494, N00014-80-C-0505
Sponsored in part by Contract N00014-82-K-0334.

We consider the problem of moving a three dimensional solid object among polyhedral obstacles. The traditional formulation of configuration space for this problem uses three translational parameters and three angles (typically Euler angles), and the constraints between the object and obstacles involve transcendental functions. We show that a quaternion representation of rotation yields constraints which are purely algebraic in a higher-dimensional space. By simple manipulation, the constraints may be projected down into a six dimensional space with no increase in complexity. Using this formulation, we derive an efficient exact intersection test for an object which is translating and rotating among obstacles.

515,050
AD-A148 969/9 Not available NTIS
New York Univ., NY. Courant Inst. of Mathematical Sciences.
Piano Movers' Problem. V. The Case of a Rod Moving in Three-Dimensional Space Amidst Polyhedral Obstacles,
J. T. Schwartz, and M. Sharir. 1984, 34p
Contracts N00014-75-C-0571, N00014-82-K-0381
See also AD-A129 509.
Availability: Pub. in Communications on Pure and Applied Mathematics, v37 p815-848 1984 (No copies furnished by DTIC/NTIS).

No abstract available.

515,051
AD-A149 012/7/GAR PC **A08/MF A01**
Inform G.m.b.H., Aachen (Germany, F.R.).
Efficient Algorithm for Fuzzy Linear Programming with Multiple Objectives.
Final technical rept.,
R. Hillekamp, G. W. Hintz, B. Werners, H. J. Zimmermann, and P. Zysno. 1 Dec 84, 173p
Contract DAJA45-82-C-0009

On the basis of fuzzy linear programming an interactive Decision Support System has been developed which can handle mathematical programming problems with many crisp or fuzzy objective functions and crisp as well as flexible constraints. Empirically tested connectives and membership functions have been included. (Author)

515,052
AD-A149 015/0/GAR PC **A03/MF A01**
Stanford Univ., CA. Dept. of Statistics.
Inequalities for the M/G/Infinity Queue and Related Shot Noise Processes.
Technical rept.,
F. Huffer. 29 Nov 84, 47p Rept no. TR-351
Contracts N00014-76-C-0475, N00014-83-K-0238

This report deals with shot noise processes X(t) which are formed by the superposition of pulses having random durations.

515,053
N85-13525/9/GAR PC **A02/MF A01**
Instituto de Pesquisas Espaciais, Sao Paulo (Brazil).
Inducao de Regras de Decisao Nebulosas (Induction of Fuzzy Decision Rules).
O. D. Silva, and C. Derenna E Souza. Apr 83, 7p INPE-3053-PRE/474
In Portuguese; English Summary. Presented at the IEEE Intern. Conf. Latincon 84, Mexico City, 9-13 Jul. 1984.

Results and concepts of investigations in a fuzzy set theory encountered in the literature are presented. The main reasons for inducing decision rules are the need to reduce the amount of rules and modeling of new rules by induction. The induction of new decision rules consists of a set of rules with the same conclusion (fuzzy or Boolean) and different premises (fuzzy or Boolean) as well as certainty degrees. Definition of such concepts as production rule, consistent rule, degree of certainty, induced consistent rule, etc., are presented. Th problem of Boolean decision rules and fuzzy interference are analyzed. Decision rules can be applied in medical diagnosis (MYCIN computerized consultation), geological prospecting, error detection in space systems, etc. The advantage of the induction method is its general applicability and simplicity.

515,054
N85-13665/3/GAR PC **A02/MF A01**
Instituto de Pesquisas Espaciais, Sao Paulo (Brazil).
Selecao de Projetos de p and D COM Retornos Nao-Numericos (R and D Project Selection with Nonnumerical Returns).
O. P. Dias. May 84, 12p INPE-2760-PRE/335
In Portuguese; English Summary. Presented at the 16TH Simp. Brasileiro le Pesquisa Operacinal, Florianopolis, Brazil, Oct. 1983.

The multi-criteria project selection problem subject to linear constraints, with zero-one decision variables (accept or reject kind) is discussed. The project appraisals in each criterium are done using linguistic instead of numeric values, with their meaning represented by fuzzy sets. The computation of the grade of membership of a given alternative, in the fuzzy set of all nondominated alternatives, is made by an algorithm that converges rapidly on the final solution taking very little computer processing time.

515,055
N85-13668/7/GAR PC **A03/MF A01**
Foersvarets Forskningsanstalt, Stockholm (Sweden).
Dynamic Decision Making.
M. Lind, R. Allard, and B. Brehmer. Mar 84, 46p FOA-C-53015-H2
In Swedish; English Summary.

A model of dynamic decision making based on control theory is presented, and is contrasted with a general model of static decision making. The importance of having better knowledge of the learning process in dynamic decision making when constructing dynamic situations is stressed. A simulation program for experimental studies is described.

515,056
PB85-142974 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
IFORS (International Federation of Operational Research Societies) in Retrospect, IFORS Twenty-Fifth Anniversary Banquet Speech.
Final rept.,
J. H. Engel. 1984, 11p
Sponsored by International Federation of Operational Research Societies and Technical Univ. of Denmark, Lyngby.
Pub. in Operational Research '84, p55-65 1984.

The author reviews, in a non-technical way, what has happened to IFORS during its first twenty-five years, and shows that IFORS has succeeded in encouraging the creation of a world-wide community of scientists engaged in operational research.

13. MECHANICAL, INDUSTRIAL, CIVIL, AND MARINE ENGINEERING

13A. Air Conditioning, Heating, Lighting, and Ventilating

515,057
AD-A148 884/0/GAR PC **A05**/MF **A01**
Naval Civil Engineering Lab., Port Hueneme, CA.
Reliability, Availability, and Maintainability of the Heat Recovery Incinerator at Naval Air Station , Jacksonville.
Final rept. Jun 82-May 83,
J. Zimmerle. Oct 84, 78p Rept no. NCEL-TN-1709

The performance of the Heat Recovery Incinerator (HRI) at Naval Air Station (NAS) Jacksonville, Fla., was studied from June 1982 to May 1983. The study included RAM (reliability, availability, maintainability) analysis of hardware components and five functional missions: (1) processing and incinerating waste and producing steam; (2) processing and incinerating waste; (3) incinerating waste; (4) incinerating waste and producing steam; and (5) combusting fuel oil and producing steam. Eight operational variables were monitored that included: waste generation rate, processing rate, incineration rate, ash production, landfill reduction, energy parameters, processing time, and incineration time. The HRI performed only two of its five missions (2 and 3) during the test period because no steam was produced. Principal problems were failures of the hydraulic system, boiler water levels controls, and storage system. Dust contamination and waste jams necessitated a number of maintenance actions. The HRI was excessively labor intensive which caused the NAS Jacksonville Command to shut down the HRI following the study. The types of design, operation, and maintenance problems that occurred at the facility are discussed, and recommendations are made to correct these problems in future designs.

515,058
AD-A148 902/0/GAR PC **A03**/MF **A01**
Naval Ocean Systems Center, San Diego, CA.
Building 1 Cooling Tower Ozone Project.
Final rept. Apr 83-Feb 84,
J. P. Hurley. 30 Sep 84, 36p Rept no. NOSC/TD-741

A description is given of the use of ozone to treat circulation water in the NOSC (Naval Ocean Systems Center-San Diego) Building 1 cooling tower. Topics include tower operating data, ozone equipment installation and operation, chemical and bacterial analyses; problems encountered, and benefits realized.

515,059
AD-A149 063/0/GAR PC **A02**/MF **A01**
Minnesota Univ., Minneapolis. Dept. of Mechanical Engineering.
Simple Model for Predicting the Flux Distribution through the Focal Plane of a Multifaceted-Concentrator Solar Furnace.
Interim technical rept.,
D. E. E. Carlson, R. B. Diver, and E. A. Fletcher. 6 Dec 84, 12p Rept no. TR-5
Contract N00014-82-K-0523

A model of the flux distribution at the focus of a multifaceted concentrator is presented and compared with the observed performance of a real research furnance. Originator-supplied keywords include: Solar furnances, Solar concentrators, and Solar flux distribution.

515,060
DE84011732/GAR PC **A03**/MF **A01**
Argonne National Lab., IL.
Three-Dimensional Analysis of Heat Transfer and Gas Flow in a Radiant Furnace.
R. W. Lyczkowski, C. S. Wang, G. F. Berry, L. S. H. Chow, and T. R. Johnson. 1984, 41p CONF-841201-7
Contract W-31-109-ENG-38
ASME winter annual meeting, New Orleans, LA, USA, 9 Dec 1984.
Portions are illegible in microfiche products.

The three-dimensional steady-state fluid flow and temperature patterns in an experimental magnetohydrodynamic (MHD) radiant furnace were analyzed using the COMMIX-1A computer program. These results, together with a transient three-dimensional tracer simulation were used to develop a model for characteristic residence times and temperatures. This model was used with the KINE computer code to interpret experimental nitric oxide (NO) decomposition rates. Good agreement with such data demonstrated the usefulness of the methodology for interpreting various experimental gas reaction data related to radiant furnaces, and as an aid in the design of high temperature furnaces and boilers of unconventional or severe service. Specifically, we have analyzed the performance of the radiant furnace section of the University of Tennessee Space Insitute (UTSI) Coal-Fired Flow Facility (CFFF). 14 references, 15 figures. (ERA citation 10:002481)

515,061
DE84012001/GAR PC **A04**/MF **A01**
National Coal Board, Leatherhead (England). Coal Utilization Research Lab.
20-Atmosphere Rig PFBC Results: Tests 18 and 19. Further Investigation into Agglomerate Formation when Using Limestone as the Sorbent.
A. G. Roberts. May 84, 60p DOE/MC/14129-1655
Contract AC21-80MC14129
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In previous tests with Pittsburgh No. 8 coal and Carbon limestone, it was found that the bed began to agglomerate when operating at 10 to 16 atm pressure, 1560 eF bed temperature and 3ft/s fluidising velocity. The problem could only be overcome by increasing the fluidising velocity and/or decreasing the bed temperature. Similar problems have occurred with another coal and limestone in the 20 atm rig (not part of the DOE programme) and are also known to have occurred with coal and limestone in at least one other combustor. The problem did not exist with limestone and a coal having a refractory ash, nor does it exist at the above operating conditions when burning Pittsburg No. 8 and dolomite. Tests 18 and 19 were devised to try and overcome this agglomerating problem by reducing the peak temperatures in the region near the coal inlet nozzle. In Test 18, the intention was to convey the crushed coal into the combustor in a stream of nitrogen, instead of air. In Test 19, the coal was fed as a coal-water slurry. (ERA citation 10:003079)

515,062
DE84013046/GAR PC **A19**/MF **A01**
Solar Energy Research Inst., Golden, CO.
Design of Energy-Responsive Commercial Buildings.
S. Ternoey, L. Bickle, C. Robbins, R. Busch, and K. McCord. Sep 84, 435p SERI/SP-254-1538D
Contract AC02-83CH10093
Portions are illegible in microfiche products. Original copy available until stock is exhausted.

This book is specifically written to show the benefits and liabilities of existing energy-related alternatives on a whole-building level. Many case studies and examples are presented to summarize the abilities and impact on design of existing alternative means of environmental control and the methods that are being used to assess this problem. The intent is both to present the principles, advantages, and disadvantages of alternative solution types and design approaches and to comparatively assess the abilities of the alternatives to support wider, whole-building design concerns. A detailed, nontechnology-specific approach to the design of energy-responsive commercial buildings is presented. This framework is intended to provide a logical basis for considering energy issues in the design process and is formulated to encourage innovation and reinvention by the reader. (ERA citation 10:002525)

515,063
DE84017335/GAR PC **A02**/MF **A01**
Whetstone Branch Living School, Ferrum, VA.
Vertical Solar Louver Project. Final Technical Report.
C. J. Bier. 15 Sep 84, 11p DOE/CE/15135-T1
Contract FG01-82CE15135
Portions are illegible in microfiche products. Original copy available until stock is exhausted.

The thermal network analysis computer program MICROPAS has been used to analyze Vertical Solar Louvers and other reference solar designs in eight selected climates. The results have been used to generate a set of correlation coefficients for use in performance predictions by the Solar Load Ratio method as described in The Passive Solar Design Handbook: Volume Three (1). At low mass VSL were shown to be superior to ordinary direct gain and equal to the trombe wall systems in energy savings. The energy savings advantage of VSL over direct gain disappears in comparable systems of high mass. Identical solar water tanks of oval cross section were compared in the water wall and VSL configurations. (ERA citation 10:000408)

515,064
DE85000376/GAR PC **A03**/MF **A01**
Vodra (Richard), Destin, FL.
Solar Heating and Air Conditioning System. Final Report.
R. Vodra. 10 Sep 83, 28p DOE/R4/10495-T1
Contract FG44-81R410495

This modularly constructed system is primarily designed for attic or clerestory installation although it may be adapted to function as a dwelling appendage or as a separate unit. Its aim, as a solar heating system, is to approach efficiencies attained only by active systems but minimize their inherent expense and maintenance problems by eliminating the requirements for recirculating collectors, plumbing, pumps, heat exchangers, filters, getters, etc. The prime uniqueness of this design, however, is the ability to convert the major elements of the heating system into an active evaporative cooling unit during summer months. As there is usually more energy expended for summer air conditioning than winter heating the energy cost effectiveness of a year-round device should prove more than double that of a solar heating device. Innovations incorporated in this design development include evaporators, panel seals, operating mechanics, instrumentation. Since it requires both summer and winter seasons to analyze the effectiveness of this design, only the summer cooling mode has been examined at this writing. A supplemental report covering winter heating must be submitted at a later date. The model used for this experiment was able to reduce the temperature of an attic area from 120 exp 0 F to an average of 79 exp 0 F with an outside daytime average ambient temperature of 89 exp 0 F and a relative humidity of 70%. (ERA citation 10:000413)

515,065
DE85000508/GAR PC **A04**/MF **A01**
Solar Energy Research Inst., Golden, CO.
High Performance Solar Desiccant Cooling System: Performance Evaluations and Research Recommendations.
D. R. Schlepp, and K. J. Schultz. Sep 84, 51p SERI/TR-252-2497
Contract AC02-83CH10093

This report presents an assessment of the current status of solar desiccant cooling and makes recommendations for continued research to develop high performance systems competitive with conventional cooling systems. Solid desiccant, liquid desiccant, and hybrid systems combining desiccant dehumidifiers with vapor compressor units are considered. Currently, all desiccant systems fall somewhat short of being competitive with conventional systems. Hybrid systems appear to have the greatest potential in the short term. Solid systems are close to meeting performance goals. Development of high performance solid desiccant dehumidifiers based on parallel passage designs should be pursued. Liquid system collector/generators and efficient absorbers should receive attention. Model development is also indicated. Continued development by hybrid systems is directly tied to the above work. (ERA citation 10:002153)

515,066
DE85000509/GAR PC **A04/MF A01**
Solar Energy Research Inst., Golden, CO.
Performance of the SERI (Solar Energy Research Institute) Parallel-Passage Dehumidifer.
D. Schlepp, and R. Barlow. Sep 84, 65p SERI/TR-252-1951
Contract AC02-83CH10093

The key component in improving the performance of solar desiccant cooling systems is the dehumidifier. A parallel-passage geometry for the desiccant dehumidifier has been identified as meeting key criteria of low pressure drop, high mass transfer efficiency, and compact size. An experimental program to build and test a small-scale prototype of this design was undertaken in FY 1982, and the results are presented in this report. Computer models to predict the adsorption/desorption behavior of desiccant dehumidifiers were updated to take into account the geometry of the bed and predict potential system performance using the new component design. The parallel-passage design proved to have high mass transfer effectiveness and low pressure drop over a wide range of test conditions typical of desiccant cooling system operation. The prototype dehumidifier averaged 93% effectiveness at pressure drops of less than 50 Pa at design point conditions. Predictions of system performance using models validated with the experimental data indicate that system thermal coefficients of performance (COPs) of 1.0 to 1.2 and electrical COPs above 8.5 are possible using this design. (ERA citation 10:002150)

515,067
DE85000850/GAR PC **A04/MF A01**
National Bureau of Standards (NEL), Gaithersburg, MD.
Short Duration Winter-Time Performances of Different Passive Solar Systems.
B. M. Mahajan. Aug 84, 57p NBSIR-84-2930
Contract AI01-76PR06010
Portions are illegible in microfiche products.

The thermal performance of three full-sized adjoining rooms, each with a different south-facing passive feature, were monitored for two short periods during January-February and February-March, 1984. These rooms are a Trombe wall cell, a control cell, and a direct gain cell in the NBS Passive Solar Test facility. During the experiments data from 436 sensors were collected. The data include: auxiliary energy supplied, continuous air infiltration, temperatures, solar radiation, and wind speed and direction. This report briefly describes the test facility, instrumentation, data acquisition system and procedures and test conditions for the experiments. The report presents representative data and results of a preliminary analysis of the data. It compares the performance of the three test cells, and the values of average, centroidal, maximum and minimum air temperatures in the direct gain and Trombe wall cells. Results indicate that regardless of the magnitude of the stratification the temperature recorded by the sensor placed in the vicinity of the centroid of the cell was nearly equal to the average value of the cell air temperature. The report also compares measured data with the predicted values of (1) the ratios of various solar radiation quantities; and (2) the auxiliary energy required to maintain the fixed value of the lower bound temperature in the test cells. The data and predicted values show good agreement. (ERA citation 10:002147)

515,068
DE85001152/GAR PC **A03/MF A01**
Twin Chimney Solar Designs, Winston-Salem, NC.
Direct Gain, Insulated Storage Collector, Demonstration Project. Final Report.
M. E. Tyler. 31 Dec 83, 29p DOE/ER/10440-T2
Contract FG44-81R410440

A home was constructed to demonstrate to housing professionals and individuals how well a home with passive solar design elements will function in the Piedmont region of North Carolina. The 1600 square foot wood framed house was designed to have broad market appeal. There are a number of passive solar design elements utilized, as well as close attention paid to details of thermally efficient construction. Enough glass is on the south side of the living area to provide sufficient heat on sunny days. Over half of the south glass is in the basement where there is thermal mass in the form of 55 gallon water drums and a thick concrete floor. They store the heat absorbed from the sun. This heat then radiates into the rest of the house at night. Having the thermal mass separated from the living space greatly reduces the problem of morning thermal lag, which is often seen in water wall homes. Temperature data were recorded to establish the thermal performance of the house. The quality of temperature control with this design has proven to be viable and cost effective for this region. These data, along with the concepts of solar design for the Piedmont region of North Carolina, have been presented to both individuals and housing professionals. Educational brochures were prepared and distributed, slide lectures given, group and individual consultations provided, and numerous site visits conducted. (ERA citation 10:002141)

515,069
DE85002078/GAR PC **A08/MF A01**
Automation Industries, Inc., Silver Spring, MD. Vitro Labs. Div.
Solar Energy System Case Study, Oakmead Industries, Santa Clara, California.
S. M. Rossi. Sep 84, 172p SOLAR/0011-84/02
Contract AC01-79CS30027
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A study is made of a solar energy system for space heating and domestic hot water loads. The Renault and Handley Building, referred to as Oakmead Industries site, is a commercial office and manufacturing facility located in Santa Clara, California. The building has approximately 60,000 square feet of floor area. The solar system has 2622 square feet of liquid flat-plate collectors with a 6500-gallon storage tank. The solar energy system installation is a retrofit which did not achieve its design solar fraction. The system, however, operated well and required minimal maintenance. Performance data of the solar system was collected by the National Solar Data Network for two heating seasons, from 1980 to 1982. Highlights of the performance of the solar system during the two heating seasons are presented. (ERA citation 10:002154)

515,070
DE85002467/GAR PC **A02/MF A01**
Oak Ridge National Lab., TN.
Predicted Energy Savings for a Residential Heat Pump Utilizing a Fluidized-Bed Heat Exchanger.
E. A. Vineyard. 1984, 10p CONF-8410153-3
Contract AC05-84OR21400
Heat pump technology conference, Tulsa, OK, USA, 15 Oct 1984.
Portions are illegible in microfiche products.

The objective of this study was to determine if the energy efficiency of an optimized, state-of-the-art, residential heat pump could be increased by utilizing a fluidized-bed heat exchanger in place of a conventional heat exchanger on the outdoor side of the heat pump system. Using the Oak Ridge National Laboratory (ORNL) Heat Pump Model, comparisons were made between the advanced system (utilizing a fluidized-bed heat exchanger) and the base system (optimized, state-of-the-art) in eleven cities. The calculated annual energy savings for the advanced system ranged from 29 to 777 kWh/y, with the largest savings occurring in areas where the frosting and defrosting losses of the base unit are greatest, such as in the northeast. (ERA citation 10:002510)

515,071
DE85002567/GAR PC **A02/MF A01**
Battelle Columbus Labs., OH.
Assessment of Ground-Coil Heat-Pump Technology.
R. D. Fischer, G. H. Stickford, and F. E. Jakob. 1984, 19p CONF-8410153-2
Contract AC05-84OR21400
Heat pump technology conference, Tulsa, OK, USA, 15 Oct 1984.
Portions are illegible in microfiche products.

This paper summarizes results from an analytical comparison of the performance and economics of residential space conditioning with three types of ground-coupled heat-pump systems and air-source systems in ten metropolitan areas of the United States. Additional results from parametric analyses of the effects of costs, soil properties, operating strategy and alternate system configurations are also summarized. (ERA citation 10:002509)

515,072
DE85002757/GAR PC **A07/MF A01**
Texas Univ. at Austin. Center for Energy Studies.
Water-Lithium Bromide Double-Effect Absorption Cooling Analysis. Final Report.
G. C. Vliet, M. B. Lawson, and R. A. Lithgow. Dec 80, 128p DOE/SF/10540-T2
Contract AC03-79SF10540
Portions are illegible in microfiche products.

This investigation involved the development of a numerical model for the transient simulation of the double-effect, water-lithium bromide absorption cooling machine, and the use of the model to determine the effect of the various design and input variables on the absorption unit performance. The performance parameters considered were coefficient of performance and cooling capacity. The sensitivity analysis was performed by selecting a nominal condition and determining performance sensitivity for each variable with others held constant. The variables considered in the study include source hot water, cooling water, and chilled water temperatures; source hot water, cooling water, and chilled water flow rates; solution circulation rate; heat exchanger areas; pressure drop between evaporator and absorber; solution pump characteristics; and refrigerant flow control methods. The performance sensitivity study indicated in particular that the distribution of heat exchanger area among the various (seven) heat exchange components is a very important design consideration. Moreover, it indicated that the method of flow control of the first effect refrigerant vapor through the second effect is a critical design feature when absorption units operate over a significant range of cooling capacity. The model was used to predict the performance of the Trane absorption unit with fairly good accuracy. The dynamic model should be valuable as a design tool for developing new absorption machines or modifying current machines to make them optimal based on current and future energy costs. (ERA citation 10:002143)

515,073
PB85-140879/GAR PC **E05/MF E05**
Norges Tekniske Hoegskole, Trondheim. Selskapet for Industriell og Teknisk Forskning.
Ventilation Efficiency. Part 4. Displacement Ventilation in Small Rooms,
H. M. Mathisen, and E. Skaret. 23 May 83, 192p STF15-A84047, ISBN-82-595-3692-7
See also PB85-140887. Sponsored by Royal Norwegian Council for Scientific and Industrial Research, Kjeller.

The objective of this research project is to study the effect of low air velocity supply direct to the zone of occupation in small rooms with regard to effective ventilation and thermal comfort. A two zone mixing model is used to describe the concept of, and to define the effectiveness of ventilation.

515,074
PB85-140887/GAR PC **E04/MF E04**
Norges Tekniske Hoegskole, Trondheim. Selskapet for Industriell og Teknisk Forskning.
Ventilation Efficiency. Part 6. A Survey of Concepts of Ventilation Effectiveness,
E. Skaret. 18 Jul 84, 48p STF15-A84057, ISBN-82-595-3738-9
See also PB85-140879. Sponsored by Royal Norwegian Council for Scientific and Industrial Research, Kjeller.

This report contains a summary of state of the art regarding concepts of ventilation effectiveness (efficiency) and are dealing with one-zone models, two-zone models and the concepts derived from age distribution analyses. Ventilation effectiveness can principally be separated in two parts. (i) The air exchange efficiency for the ventilation air flow, and (ii) The ventilation effectiveness or the removal effectiveness of contaminants. Both is overall values for the total room volume. In addition it is shown how local conditions can be assessed. The last part of the report reviews results from a test chamber where described concepts are used.

515,075
PB85-143154/GAR PC **E04/MF E04**
Central Electricity Generating Board, Southampton (England). Technology Planning and Research Div.

Modifications to FURDEC (Furnace Heat Transfer Program) to Include Self-Consistent Flame Modelling.
S. Cooper. c1984, 46p TPRD/M/1409/N84

The furnace heat transfer program FURDEC has been modified to provide the automatic generation of the heat release distribution. This has been achieved by incorporating simple one-dimensional flame models which are calculated along individual flame paths through the flow field. The model for coal-firing calculates the flame heat release consistent with the thermal environment by iterating between flame model and heat transfer model calculations. For oil-firing, where combustion is less dependent on chemical kinetics, the flame model calculation precedes the heat transfer computation. This Note describes the basic approach to the model formulation and discusses in detail the convergence behavior of the flame model/heat transfer model system.

515,076
PB85-153443/GAR PC **A05/MF A01**
National Bureau of Standards (NEL), Gaithersburg, MD. Center for Building Technology.
Research Priorities for Improving the Effectiveness of Active Solar Hot Water and Space Conditioning Systems.
Final rept.,
R. D. Dikkers, W. J. Kennish, C. B. Winn, and W. Huston. Dec 84, 76p NBSIR-84/2980
Contract DE-AI01-76PR06010
Prepared in cooperation with TPI, Inc., Beltsville, MD. and Solar Environmental Engineering Co., Inc., Fort Collins, CO.

As part of the FY 1983 Department of Energy Systems Effectiveness Research Program, the National Bureau of Standards (NBS) was assigned responsibility for developing research priorities for improving the effectiveness (i.e., thermal performance, cost, reliability and maintainability) of active solar hot water and space conditioning systems. To carry out this task, NBS, in cooperation with various industry representatives, organized and conducted two meetings in August 1983. The first meeting covered all major aspects of active solar hot water and space conditioning systems. The second meeting dealt only with solar control subsystems. Based on information obtained from these meetings, recommended research priorities for improving the effectiveness of active solar energy systems are presented.

13B. Civil Engineering

515,077
AD-A148 858/4/GAR PC **A03/MF A01**
Corps of Engineers, Omaha, NE. Missouri River Div.
Laboratory Investigation of Marina Entrances on the Missouri River.
Sep 84, 45p Rept no. MRDL-13

This report presents results of model studies on Missouri River boat marina entrance configurations which were conducted at Mead Hydraulic Lab. Small boat marinas along alluvial rivers are constantly plagued by the deposition of sediment at marina entrances and, subsequently, within the marina themselves. Dredging of this accumulated sediment is usually required at regular intervals. Recognizing that no system of entrance structures or alignment will totally prevent the deposition of sediment, the objective of this investigation was to determine how to minimize the deposition of sediment in a marina entrance. This investigation evaluated the Sioux City type marina entrance which incorporated recommendations from the Bucharest Report. Also studied were the UNL (Univ. of Nebraska at Lincoln) egg-shaped basin and other successful marina entrances on the Missouri River.

515,078
AD-A148 863/4/GAR PC **A14/MF A01**
Army Engineer Div. North Pacific, Bonneville, OR. Div. Hydraulic Lab.
Spillway Deflectors at Bonneville, John Day and McNary Dams on Columbia River, Oregon-Washington and Ice Harbor, Lower Monumental and Little Goose Dams on Snake River, Washington. Hydraulic Model Investigation.
Final rept. Aug 71-Aug 76,
M. M. Kubo. Sep 84, 306p Rept no. TR-104-1

Highly aerated water flowing over the spillways and plunging into the deep stilling basins of dams increases the nitrogen levels of the rivers to a supersaturated condition hazardous to migrating fish. The report presents data and results of hydraulic model studies conducted in development of spillway deflectors for six projects on the lower Snake and Columbia Rivers. The deflectors prevent the plunging action and cause a more skimming-type flow near the surface of stilling basin resulting in reduced nitrogen saturation levels. The models were used to design the deflector geometries and to assist in evaluating their effect on fishway attraction flow near downstream fishway entrances at each project. Prototype measurements indicate that the deflectors have been effective in reducing nitrogen levels at the projects.

515,079
AD-A148 864/2/GAR PC **A11/MF A01**
Army Engineer Div. North Pacific, Bonneville, OR. Div. Hydraulic Lab.
Dworshak Dam, North Fork Clearwater River, Idaho. Hydraulic Model Investigation.
Final rept. Dec 63-Jul 72,
P. M. Smith, H. P. Theus, and L. Z. Perkins. Sep 84, 241p Rept no. TR-116-1

Dworshak Dam, located on the North Fork of the Clearwater River near Orofino, Idaho, is the highest straight-axis concrete gravity dam in the United States (717 feet from foundation to 3,300-foot-long crest). The project includes a powerhouse for six Francis-type units (ultimate installation), a selective withdrawal structure upstream from the powerhouse intakes, two spillway bays and three regulating conduits that discharge into a stilling basin, an excavated exit channel, and facilities for migratory fish. The Dworshak National Fish Hatchery was constructed to replace spawning and rearing areas for steelhead trout that formerly migrated into the North Fork. The report describes studies accomplished in four hydraulic models and three full-scale test facilities. Tests and data obtained during development of design of the spillway, regulating conduits, and stilling basin are presented in the report. The design of the skewed regulating conduit entrances were of primary concern in the project. Prototype operation of the outlets resulted in cavitation damage downstream from the valves; an aeration deflector was designed in the model to remedy the problem.

515,080
AD-A148 893/1/GAR PC **A06/MF A01**
Army Engineer Waterways Experiment Station, Vicksburg, MS. Structures Lab.
Repair, Evaluation, Maintenance, and Rehabilitation Research Program. Engineering Condition Survey of Concrete in Service.
Final rept. Jan 82-Feb 83,
R. L. Stowe, and H. T. Thornton. Sep 84, 112p Rept no. WES/TR/SL/REMR-CS-1

Civil works structures must be continually evaluated for structural safety, stability, and operational adequacy. The overall objective of this investigation is to develop information essential to the continued safety of concrete used in civil works structures such as flood control and multipurpose dams, navigation locks and dams, powerhouses and appurtenant structures, floodwalls, pumping stations, and similar structures. Specific objectives include (a) development and evaluation of materials and techniques for repair and rehabilitation of civil works structures, (b) development of engineering guidance to evaluate and monitor safety of structures, and (c) development of design and construction methods for rehabilitating older structures to comply with current structural design criteria. This report summarizes pertinent inspection procedures and methods of evaluation used by the Corps of Engineers in evaluating concrete civil works structures. Methods of evaluation include experience gained at the Waterways Experiment Station. Techniques are presented which have a potential for ascertaining the extent and cause of inadequacies in concrete structures.

515,081
AD-A148 947/5/GAR PC **A03/MF A01**
Naval Civil Engineering Lab., Port Hueneme, CA.
Solid Waste Management Options for Naval Installations on Guam.
Final rept. Jun 83-Feb 84,
R. M. Roberts. Oct 84, 40p Rept no. NCEL-TN-1711

The Navy's solid waste (SW) management operations and energy production/distribution systems on the island of Guam were inspected and evaluated. Air Force and Civil (GovGuam) operations were also brought into the study in the interest of exploring possible integrated concepts. It was found that SW procedures practiced by the PWC Guam conform well with NAVFAC instructions and EPA guidelines. Opportunities for resource recovery, particularly of aluminum and boxboard, should be exploited, however. The collection and landfill disposal operations can be continued for up to 15 years before changes need to be made. Benefit/cost analyses of alternative disposal approaches were performed. The concept of burning all of the Navy's SW to steam-drive the Naval station's air conditioning plant emerged as a possibility. Another cost beneficial approach, but one involving the other jurisdictions, would be to erect a turbo-electric (2.5-MW) facility that would fire all of the SW generated on Guam. The mass-fired plant would be owned by GovGuam and preferably operated by a full-service contractor. Since both the GovGuam and Air Force landfills have very limited additional usage and acceptable new sites are quite limited, the concept would solve the serious SW disposal problems now faced by both of those entities.

515,082
AD-A149 008/5/GAR PC **A06/MF A01**
Petroleum Refinery Point Source Task Force, Windsor (Ontario).
Review of the Pollution Abatement Programs Relating to the Petroleum Refinery Industry in the Great Lakes Basin.
Nov 82, 123p
Report to the Great Lakes Water Quality Board.

This report describes the findings of the Task Force regarding effluent quality improvement, analytical protocols, trends of pollutant loading, and compliance with jurisdictional effluent limitation. It also discusses the petroleum refineries located in Areas of Concern, as defined by the Board. In summary, the Task Force concludes that since 1976 there has been a significant improvement in the quality of the wastewater being discharged from petroleum refineries to the Great Lakes Basin. It also believes that additional efforts should be made to evaluate the possible long-term adverse effects of potentially toxic substances known to be present in refinery effluents in low quantities.

515,083
DE84012002/GAR PC **A04/MF A01**
National Coal Board, Leatherhead (England). Coal Utilization Research Lab.
20-Atmosphere Rig PFBC Results: Test 20. Investigations with a Medium-Volatile Content Coal.
A. G. Roberts. May 84, 51p DOE/MC/14129-1656
Contract AC21-80MC14129
Portions are illegible in microfiche products. Original copy available until stock is exhausted.

The objectives of this test were: to obtain data (e.g. on combustion efficiency, sulphur capture and NO/sub x/ emission) when burning a lower volatile coal than previously and to compare directly (i.e. within a single test), performance when burning coal fed as a slurry with dry coal fed pneumatically. (ERA citation 10:003080)

515,084
DE84017333/GAR PC **A05/MF A01**
Lin (Ping-Wha), Angola, IN.
Project on Sulfur Dioxide Removal and Waste Products Utilization Process. Final Report.
P. W. Lin. Jun 84, 93p DOE/CE/15143-T1
Contract FG01-82CE15143
Portions are illegible in microfiche products. Original copy available until stock is exhausted.

The report describes the pilot plant evaluation for a unique process designed for effectively removing sulfur dioxide from stack gas and converting it into useful product as construction materials, chemical for water and wastewater treatment. The product can also be recycled for further SO/sub x/ removal. The product are particles having a core of lime surrounded by a shell of anhydrous calcium sulfate, which has a plurali-

ty of cracks. The product has been given a coined name Linfan. The process evaluation has shown that it is very efficient in sulfur oxide (SO sub 2 and SO sub 3) removal, 100% or near 100% removal efficiency has been attained. (ERA citation 10:002538)

515,085
DE84770477/GAR PC **A02/MF A01**
Duerr Anlagenbau G.m.b.H., Stuttgart (Germany, F.R.).
Industrial Exhaust-Air Purification Employing the Process of Adsorption to Activated Carbon.
H. G. Guenter. 1964, 20p NP-4770477
In German.
U.S. Sales Only.

For solving problems with exhaust air, the adsorption process with activated charcoal is suited to application in many industrial branches. The process can be employed for obtaining complete odour removal, decreasing operation cost and recovering solvents, espec., if very large amounts of exhaust air with relatively low concentrations of pollutants have to be dealt with and which are not authorized by law or government bodies. By a combination of the adsorption technique with various physico-chemical base processes, it is possible to realise optimum solutions for a range of very different requirements. The article on hand expounds the criteria for application and the components of adsorption combination plants including a description of implemented plant concepts and additional possible applications. (ERA citation 10:001075)

515,086
DE85000165/GAR PC **A04/MF A01**
Lawrence Livermore National Lab., CA.
Engineering Research Progress Report, October 1983-March 1984.
H. H. Woo, J. C. Cherniak, J. D. Hymer, and M. B. Kamelgarn. Aug 84, 64p UCID-19323-84-2
Contract W-7405-ENG-48

Our intent in this progress report is to provide a summary of the activities pursued by members of the Mechanical Engineering (ME) Department's Engineering Research Program. The Program's mission is to do research for specific applications in mechanical-engineering fields that are of immediate or potential interest to the Laboratory. The FY84 Program comprises nine projects in four thrust areas in the ME Department. The thrust areas are: Surface Measurements and Characterization; Fabrication Technology; Materials Characterization and Behavior; and Computer-Aided Engineering. In the past, our research was supported almost exclusively by weapons programs; recently, however, we significantly increased our involvement in other Laboratory programs as well. In response to this change, we have established new procedures and guidelines for the submission, review, and selection of research proposals. (ERA citation 10:002972)

515,087
DE85000754/GAR PC **A02/MF A01**
Science Applications, Inc., San Diego, CA.
Development of Process for Combined NO/sub X//SO/sub X/ Control. Technical Progress Report, September 1984.
15 Oct 84, 4p SAIC-84/1782
Contract AC22-83PC60265

Testing of copper-exchanged synthetic mordenite for combined SO sub 2 adsorption and NO/sub x/ reduction using ammonia as the reducing gas was begun. Column trading times varied from 109 to 163 minutes for greater than 99% SO sub 2 removal. The NO/sub x/ reduction efficiencies were greater than 70%, except for one run that was inexplicably low. Regeneration times and efficiencies were quite dependent on the regeneration gas. Hydrogen was better than CO or CH sub 4 , which were about the same. Utilization efficiencies of the copper were high, which reduces the size of the adsorbent beds required. (ERA citation 09:049400)

515,088
DE85001015/GAR PC **A02/MF A01**
Air Pollution Technology, Inc., San Diego, CA.
Laboratory/Bench Scale Testing and Evaluation of A.P.T. Dry Plate Scrubber. Fifty-Fifth Monthly Report, September 1-September 30, 1984.
18 Oct 84, 8p DOE/ET/15492-T59
Contract AC21-80ET15492

The A.P.T. Dry Plate Scrubber (DPS) uses a shallow, dense mobile bed of solid collector granules which move across a perforated plate. The gas stream containing fine particles and vapors is moved upward through the perforations to form high velocity gas jets. The fine particles are removed by inertial deposition onto the collector granules or by direct interception. Electrostatic forces also can be used to improve the collection efficiency and increase the adhesive forces between the particles and collectors. The DPS column consists of a series of collection stages (perforated plates) with the collectors either passing sequentially over each stage or being fed separately to each stage. The stages can be designed so as to promote the collection of large particles on the lower stages and the collection of fine particles and alkali vapors on the upper stages. The objective of this project is to conduct a bench scale experimental evaluation of the DPS at high temperature and pressure to determine its potential for controlling particulate and alkali vapor emissions from PFBC processes. (ERA citation 10:000522)

515,089
DE85003058/GAR PC **A07/MF A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Steam Stripping of Oil Shale Wastewaters. LBL/SEEHRL Steam Stripper: Design, Operation, and Maintenance Manual.
R. H. Sakaji, P. Persoff, and C. G. Daughton. Aug 84, 146p LBL-18207
Contract AC03-76SF00098

Steam stripping is the most often proposed means of treating oil shale wastewaters for the removal of ammonia and carbon dioxide. The removal of organic carbon generally is not an objective. This manual compares current steam stripper design theory with actual operating data reported in the literature and concludes that discrepancies exist between theory and actual practice. Although this manual is by no means a complete literature review on the more detailed subject of mass transfer, references are provided so that the reader can explore the subject material more closely. The primary intent of the manual is to give the operator a brief overview of the chemical and physical principles underlying the steam stripping process. Sufficient information is provided so that the operator can understand how the LBL/SEEHRL experimental-scale steam stripper was designed to be operated. Start-up procedures are detailed, and modifications required to improve performance are presented. Included are notes outlining periodic maintenance procedures for mechanical parts, protocols for the reduction of data, notes on the methods of chemical analysis, and the calculations used for mass balances. 66 references, 16 figures, 21 tables. (ERA citation 10:001933)

515,090
PATENT-4 485 747 Not available NTIS
Environmental Protection Agency, Washington, DC.
Reducing Pollutant Emissions by Fines Removal. Patent.
D. W. Pershing, G. B. Martin, and J. M. Munro. Filed 15 Jul 83, patented 4 Dec 84, 15p PB85-141802, PAT-APPL-6-514 192
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $1.00.

A method and apparatus for reducing pollutant emissions, and in particular, for reducing NOx and particulate emissions, from a spreader-stoker-fired furnace and from a fluidized bed combustor. A combustible material of various sized particles is obtained and those smaller particles which would normally combust during the suspension phase of the spreader-stoker-fired furnace or fluidized bed combustor are separated from the larger particles. The larger particles of combustible material are then introduced into the spreader-stoker-fired furnace or fluidized bed combustor and combusted to produce heat.

515,091
PB85-138584/GAR PC **A07/MF A01**
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Sciences Research Lab.
Scientific Assessment Document on Status of Complex Terrain Dispersion Models for EPA Regulatory Applications,
F. A. Schiermeier. Nov 84, 133p EPA/600/3-84/103

The U.S. Environmental Project Agency is sponsoring the Complex Terrain Development program, a multi-year integrated effort to develop, evaluate, and refine practical plume dispersion models for calculating ground-level air pollutant concentrations that result from large emission sources located in mountainous terrain. At the present time, slightly more than halfway through the effort, a scientific assessment document on the status of complex terrain dispersion models for regulatory application has been prepared to inform potential users of the current availability of complex terrain dispersion models, and to describe the future products of the Complex Terrain Model Development program. This assessment document summarizes the meteorological phenomena of importance to complex terrain modeling and describes currently available modeling techniques. Results from selected model evaluation studies and from related fluid modeling simulations are also presented. Based on this current state of model development, suggestions are presented for model improvements and for current and future research needs. The assessment document concludes with a summary of major findings and associated conclusions pertinent to the topic of complex Terrain dispersion modeling.

515,092
PB85-138915/GAR PC **A03/MF A01**
Kentucky Univ., Lexington. Inst. for Mining and Minerals Research.
Design Report on the Atmospheric Fluidized Bed Combustor at the Kentucky Center for Energy Research Laboratory,
J. L. Burghardt, M. J. Ruhl, S. Adibhatla, J. Hasler, and R. Cunningham. Jul 83, 37p IMMR83-079
Sponsored by Kentucky Energy Cabinet, Lexington. Prepared in cooperation with Thermal Processes, Olympia Fields, IL.

The overall objective of the IMMR combustion program is to demonstrate the feasibility of this technology for use by industry and utilities. Specific research objectives include the following: (1) evaluate the performance of the AFBC using Kentucky coals; (2) catalog the behavior of Kentucky limestones as sulfur sorbents in the AFBC; (3) evaluate the performance of the AFBC on alternate fuels such as preparation plant wastes; (4) evaluate the effect of operating conditions on AFBC performance using a variety of Kentucky fuels; (5) evaluate the engineering parameters of AFBC to optimize the operating conditions for Kentucky feedstocks; (6) evaluate the materials of construction and component reliability of the facility; (7) demonstrate uses for the spent bed material, such as for agricultural liming and low-strength concrete aggregate; (8) measure potential environmental effects of this type of combustion. The AFBC program represents a strong research and development program oriented toward solving the operational and technical problems associated with the combustion of a variety of high-sulfur/high-ash fuels. The IMMR program is intended to contribute to the ultimate commercialization of AFBC in the Commonwealth with the most prudent and efficient usage of Kentucky's energy resources.

515,093
PB85-139236/GAR PC **E03/MF E03**
Oxford Univ. (England). Transport Studies Unit.
Underlying Factors in the Development of Demand Responsive Transport in Britain,
J. M. Bailey. Oct 84, 19p TSU/REF-264
Presented at International Conference on Mobility and Transport for Elderly and Disabled People (3rd), Orlando, Florida, October 1984.

This paper discusses seventeen demand responsive services for the disabled and elderly persons. The paper is divided into sections as follow: the role of the voluntary sector; the availability of funds; legislative changes; discussion and assessment; and summary and conclusions.

515,094
PB85-139426/GAR PC **E08/MF E08**
Centre de Recherches Routieres, Brussels (Belgium).
Etat des Connaissances Relatives a l'Utilisation en Remblais Routiers de Cendres Volantes de Fraiche Production Provenant d'une ou de Plusieurs Centrales Electriques (Study of Physical Characteristics of Freshly Produced Fly-Ash from the Exhaust Gases of Coal-Fired Power Stations),
M. Thijs. c1984, 145p CR-21/84
Text in French.

The physical and geotechnical characteristics of freshly produced fly-ash collected using dry methods from the exhaust gases of, for the most part, coal-fired power stations, were studied in the laboratory and on a pre-experimental site with a view to their use as a road

embankment material. When subjected to certain conditions governing state, saturation, and stress, fly-ash used in embankment can undergo liquefaction, if it is has been inadequately compacted (below a certain critical density). The critical density can be determined in the laboratory by means of prolonged and delicate triaxial tests, which is difficult to reconcile with the tempo of the works on this type of site.

515,095
PB85-139434/GAR PC **E09/MF E09**
Institute of Hydrology, Wallingford (England).
Water Quality Modelling, Forecasting and Control,
P. G. Whitehead, and P. E. O'Connell. Jul 84, 174p R-88

A six-week workshop was held during July and August 1981 with the overall objectives of investigating methodological problems, applying water quality modelling and analysis techniques to some real-world problems. The program of research was divided into the following areas: Methodological problems in modelling water quality; real-time forecasting of water quality in river systems; decision-making and control in water quality management; modelling and control of waste water treatment plants.

515,096
PB85-139913/GAR PC**$7.00/MF A01**
Federal Highway Administration, Washington, DC.
Highway Statistics, 1983.
1984, 190p
See also PB84-132968.

The 39th of an annual series, it presents the 1983 analyzed statistics of general interest on motor fuel, motor vehicles, driver licensing, highway-user taxation, State highway finance, highway mileage, and Federal aid for highways; and 1982 highway finance data for municipalities, counties, townships, and other units of local government.

515,097
PB85-140630/GAR PC **A11/MF A01**
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
Maps Depicting Nonattainment Areas Pursuant to Section 107 of the Clean Air Act - 1984,
J. Yarn, W. Beal, and C. Tate. Jul 84, 228p EPA/450/2-84/006
See also PB82-232174.

This report is a detailed mapping of the United States depicting those areas not attaining the National Ambient Air Quality Standards for carbon monoxide, nitrogen dioxide, ozone, sulfur dioxide and total suspended particulates. It includes non-attainment area maps and supporting lists from Federal Register publications for final actions through July 1, 1984.

515,098
PB85-141711/GAR PC **A06/MF A01**
Arizona Univ., Tucson.
Manejo de Cuencas y Monitoreo Ambiental (Watershed Resources Management and Environmental Monitoring),
P. F. Ffolliott. Nov 81, 111p AID-PN-AAL-830
Contract AID/CSD-2457
Text in Spanish.

Environmental degradation of overpopulated river basins in developing countries is cause for concern and calls for immediate action. This compendium has been prepared as a basis for a regional training course in river basin management and environmental monitoring. After an introductory chapter reviewing the importance and fragility of river basin environments, statistical methods for collecting and analyzing data are briefly explained. The interrelationships between hydrological processes and vegetation and soils are examined next, followed by techniques (e.g., remote sensing) for measuring hydrological ecosystem components. Hydrological measures are then discussed.

515,099
PB85-141745/GAR PC **A09/MF A01**
Agency for International Development, Washington, DC.
Analysis of Watershed Management (El Salvador, Guatemala, Honduras),
L. Garcia. 21 Sep 82, 198p AID-PN-AAL-773

In Central America, slash and burn agriculture and extensive logging have seriously degraded vital watersheds, thereby reducing soil and water quality. This report presents the findings of an analysis of watershed management in El Salvador, Guatemala, and Honduras conducted to develop guidelines for a regional watershed management project. The report first discusses the economic significance of watershed management and its importance in the efficient operation of the hydroelectric plants which generate 66% of Central America's electricity; current and planned hydroelectric projects are briefly summarized. The national institutions in the three countries and two regional agencies which deal with hydroelectric energy generation, natural resources, and watershed management are profiled.

515,100
PB85-142701/GAR PC **A03/MF A01**
Massachusetts Inst. of Tech., Cambridge. Energy Lab.
Ambient Monitoring of Pollutants Around Synfuel Plants.
Final rept.,
D. S. Golomb, S. A. Batterman, and T. D. Rubin. Sep 84, 40p MIT/EL-84/015
Sponsored by Environmental Protection Agency, Washington, DC. Office of Environmental Processes and Effects Research.

This study was undertaken to aid in the evaluation of Environmental Monitoring Plans (EMP) submitted to the U.S. Synfuel Corporation by prospective operators of large-scale synfuel plants who are applying for financial assistance. In accordance with the Energy Security Act of 1980, such applicants must provide an acceptable EMP in order to qualify for the assistance. The EMP is reviewed in consultation with the U.S. Environmental Protection Agency (EPA) and the Department of Energy. This study was sponsored by EPA to aid in their consultative role. The study is limited to evaluating the ambient monitoring plan of the EMP. Ambient monitoring we interpret as pertaining to the surveillance and measurement of pollutants that may emanate from the synfuel complex but are found outside the perimeter of the plant buildings and facilities. The ambient so-interpreted includes the airspace, and surface- and ground-waters, beyond, above and below the perimeter ('outside-the-fence') of the complex.

515,101
PB85-143022/GAR PC **A07/MF A01**
Water and Sanitation for Health Project, Arlington, VA.
Environmenal Sanitation Master Plan for Training and Education in Tanzania.
Field rept.,
R. A. Gearheart, J. Briscoe, and E. Eng. Sep 82, 131p WASH/FIELD-58, AID-PN-AAL-647
Contract AID/DSPE-C-0080

This report provides a master plan and implementation strategy for environmental sanitation training based on the existing status of the water supply and sanitation sector in Tanzania. After summarizing the technical and institutional aspects of the present state of water supply and sanitation in Tanzania, the authors present detailed analyses of the Tanzanian Ministries of Water (MAJI); Lands, Housing, and Urban Development (ARHDI); and Health (AFYA). Discussed are the respective ministries' roles, responsibilities, activities, organization, and staffing. Next, manpower utilization and staff performance within MAJI, ARHDI, and AFYA are analyzed at the organizational, occupational, and individual levels. The training resources of MAJI, ARDHI, AFYA, the Ministry of Education, and other training institutions are then inventoried. Specific training recommendations are made for each of the three principal Ministries.

515,102
PB85-143287/GAR PC **A07/MF A01**
MacNeill (John S.), Jr., Homer, NY.
Feasibility Study of Alternative Technology for Small Community Water Supply.
Final rept. 15 Sep 81-14 Mar 84,
J. S. MacNeill, and A. MacNeill. Dec 84, 128p EPA/600/2-84/191
Grant EPA-CS-809411

A cooperative demonstration project was funded by the U.S. Environmental Protection Agency (EPA) to enable the Village of Cayuga, N.Y. to install and demonstrate water filtration technology that may be appropriate for small water systems that use surface water sources. A prefabricated filtration system consisting of two cyclone separators in parallel followed by three parallel treatment trains, each employing a contact clarifier, a mixed media filter, and a granular activated carbon filter was installed at Cayuga's existing water treatment plant. The new equipment replaced facilities built in the 1930's. After installation, careful records of the first year's operation were kept to document water quality, operating labor needs, and operating costs, including power and chemicals.

515,103
PB85-144061/GAR PC **A05/MF A01**
Environmental Research Lab., Narragansett, RI.
Evaluation of Methods to Measure the Acute Toxicity of Sewage Sludge,
D. C. Miller, M. Marcy, W. Berry, C. Deacutis, and S. Lussier. Jan 85, 77p EPA/600/D-84/295

Research was undertaken to determine whether improvements were needed to increase the reliability of acute toxicity methodologies for mysid and juvenile Atlantic silverside waste characterization tests for municipal sewage sludge. Three new acute bioassays using mysids, larval fish and calanoid copepods were designed expressly to test sewage sludge and results using these tests were compared with results from tests presently used to regulate ocean dumping of sewage sludges. Similar results were obtained in an interlaboratory comparison of methods using the same sludge samples from three wastewater treatment plants. It is concluded that the present, easier to conduct methods may be satisfactory to characterize acute toxicity of sludge.

515,104
PB85-144145/GAR PC **A02/MF A01**
SRI International, Menlo Park, CA.
Observational Study of Transport in the Free Troposphere,
J. K. S. Ching, E. E. Uthe, B. M. Morley, and W. Viezee. Jan 85, 8p EPA/600/D-84/300
Contract EPA-68-02-3791

Anthropogenic pollutants such as acidic precursors, oxidants and particulates can arrive above a convective mixed layer by penetrative convective cloud activity (venting) or by air mass convergence. The development of improved long-range transport models will require consideration of the transport and dispersion processes in both the mixed and free tropospheric layers. These processes in the free troposphere are not adequately documented or understood and are generally ignored in current trajectory calculation schemes and source to receptor models. To address this problem, a technique to track free tropospheric pollutant transport was recently developed. The feasibility of using airborne lidar to observe the three-dimensional distribution of fluorescent dye particle (FDP) tracers in long-range atmospheric transport and dispersion studies as a candidate approach has been successfully demonstrated in field experiments conducted in the North East U.S. during October 1983. This approach uses a lidar system to excite non-toxic fluorescent dye particle (FDP) released into the atmosphere, and to monitor the emitted fluorescent light. When the lidar receiver is spectrally filtered, the fluorescent light can be detected separately from the elastic backscattered signal by background aerosols. On one occasion, an FDP cloud was released above the mixing layer, and subsequently tracked over more than 300 km. On another occasion, an initially-released circular tracer cloud reached an 8-to-1 (16-to-2 km) length-to width ratio two hours after release, and a 12-to-1 (30-to-2.5 km) length-to width ratio about four hours after release.

515,105
PB85-144152/GAR PC **A02/MF A01**
Environmental Protection Agency, Cincinnati, OH. Water Engineering Research Lab.
Heterotrophic Bacteria in Potable Water: Progress in Method Options and Monitoring Benefits,
D. J. Reasoner, and E. E. Geldreich. Jan 85, 15p EPA/600/D-84/296

Measurements of heterotrophic bacteria in potable water can provide useful information to water plant operators and sanitary engineers. Bacterial density changes during treatment and quality deterioration during distribution can be monitored using heterotrophic plate count (HPC) methods. Consistent application of the HPC method selected will provide baseline data for assessing bacterial quality changes. Discussion will focus on optimizing the measurement of heterotrophic bacteria through choice of procedures, media and incubation time and temperature.

515,106
PB85-144244/GAR PC **A09/MF A01**
Massachusetts Inst. of Tech., Cambridge. Energy Lab.
Ponding of Effluents from Fossil Fuel Steam Electric Power Plants.
Final rept.,
K. J. Farley, D. R. F. Harleman, and F. M. M. Morel.
Jun 84, 186p MIT/EL-84/007
Sponsored by American Electric Power Service Corp., NY., Duke Power Co., Charlotte, NC., Public Service Electric and Gas Co., Newark, NJ. and Northeast Utilities Service Co., Hartford, CT.

Control of both the suspended solids discharge and the effluent chemistry (pH, trace metal concentrations, etc.) is of primary concern for the operation of ponding facilities. To assess the operational performance of ponds, a mathematical model has been constructed based on hydraulic transport, sedimentation of solids, and chemical reactions. Due to inadequacies in previous descriptions for (chemical) adsorption and sedimentation, the features principally addressed in development of this model have been formulations of new submodels for adsorption (surface precipitation formulation) and sedimentation (including coagulation). Application of the ponding model to fly ash ponds has demonstrated the model's ability in predicting mass removals of solids and in analyzing chemical behavior. From the effort of this research project, improvements in the operations of fly ash ponds have been determined. For solids, increased removal efficiencies can be achieved by decreasing the sluicing rate, increasing the length to width ratio of the pond, and/or proper design of the pond with respect to inflows and outflows. For chemical removal, improvements in the operations of ponds are difficult to generalize and therefore are treated on a case by case basis.

515,107
PB85-144269/GAR PC **A07/MF A01**
Massachusetts Inst. of Tech., Cambridge. Energy Lab.
Eulerian-Lagrangian Analysis of Pollutant Transport in Shallow Water.
Final rept.,
A. E. de Baptista, E. E. Adams, and K. D. Stolzenbach. Jun 84, 143p MIT/EL-84/008
Sponsored by Northeast Utilities Service Co., Hartford, CT., and New England Power Service Co., Westborough, MA.

A numerical method for the solution of the two-dimensional, unsteady, transport equation is formulated, and its accuracy is tested. The method uses a Eulerian-Lagrangian approach, in which the transport equation is divided into a diffusion equation (solved by a finite element method) and a convection equation (solved by the method of characteristics). This approach leads to results that are free of spurious oscillations and excessive numerical damping, even in the case where advection strongly dominates diffusion. The method is cost-effective in modeling pollutant transport in coastal waters, as demonstrated by two prototype applications: hypothetical sludge dumping in Massachusetts Bay and the thermal discharge from Brayton Point Generating Station in Narragansett Bay.

515,108
PB85-144327/GAR PC **A13/MF A01**
Ohio State Univ., Columbus. Engineering Experiment Station.
Guidelines for Left-Turn Treatments at Signal Controlled Intersections.
Final rept.,
Z. A. Nemeth, and J. R. Mekemson. Jun 83, 284p EES-611, FHWA/OH-83/003
Sponsored by Ohio Dept. of Transportation, Columbus.

The main objective of this research was to identify a procedure by which the impact of left turns and left turn control method on performance of the whole intersection can be quantified. A step by step procedure was developed for field data collection at intersections, evaluation of the need for left turn bays, and evaluation of the need for left turn phasing. The research involved both computer simulation and field studies. It is recommended that the guidelines, which include instructions for field data collection, and assume the application of a signal operation analysis program, such as SOAP, be followed in the evaluation of left turn control needs at fully actuated signalized intersections.

515,109
PB85-144343/GAR PC **A99/MF A01**
NATO Committee on the Challenges of Modern Society, Brussels (Belgium).
Drinking Water Microbiology. NATO/CCMS (Committee on the Challenges of Modern Society) Drinking Water Pilot Project Series,
D. O. Cliver, R. A. Newman, R. D. Pickford, and P. S. Berger. 1984, 606p CCMS-128, EPA/570/9-84/006
See also PB-301 313.

This document was prepared by NATO's Committee on the Challenges of Modern Society to examine all aspects of drinking water microbiology that have practical significance to industrialized nations. Over 50 experts from 11 countries participated in the development of this report. Seven principal areas are discussed: (1) the microbiology of raw water, (2) microbial pathogens transmitted by water, (3) indicator systems, (4) testing and standards, (5) processes used in drinking water treatment, (6) distribution systems, and (7) technological aspects of potable water microbiology.

515,110
PB85-144723/GAR PC **A07/MF A01**
National Demonstration Water Project, Washington, DC.
Water and Human Health,
F. E. McJunkin. Mar 83, 141p AID-PN-AAM-891
Contract AID/DSAN-C-0063

The availability and use of adequate, safe drinking water is essential to human health. This study of the relationship between water supply and health begins with a general overview of water-related diseases. The four subsequent sections provide detailed information on specific diseases, whether water-borne (e.g., diarrhea, cholera, typhoid fever), water hygiene (diseases which can be combated by improved personal and domestic hygiene), water contact (especially schistosomiasis), or water habitat vector-borne (malaria, filariasis) diseases.

515,111
PB85-145134/GAR PC **A04/MF A01**
Transportation Research Board, Washington, DC.
Environmental Aspects of Transportation,
P. M. Lima, P. E. Benson, A. M. Lago, D. D. McGeehan, and L. F. Cohn. 1984, 61p TRB/TRR-963, ISBN-0-309-03719-0
Library of Congress catalog card no. 84-25439.

The 8 papers in this report deal with the following areas: FHWA procedure for estimating highway user costs, fuel consumption, and air pollution: a microcomputer approach; analysis of ambient carbon monoxide data; cost-effectiveness model for analysis of tradeoffs between stationary and transportation emission controls in Baltimore; the feasibility of using computer graphics in environmental evaluations; transportation impacts on the environment in 2003; enhancements for computer-based environmental models; mitigating construction impacts on rural and urban highways; and, stringent transportation measures to reduce vehicular emissions in the New York city metropolitan area.

515,112
PB85-148708/GAR PC **A15/MF A01**
Oklahoma Univ., Norman. School of Civil Engineering and Environmental Science.
Land Treatment of Petroleum Refinery Sludges.
Final rept. Apr 80-Jun 83,
L. E. Streebin, J. M. Robertson, H. M. Schornick, P. T. Bowen, and K. M. Bagawandoss. Nov 84, 333p EPA/600/2-84/193

Petroleum API Separator sludge was applied to field plots to evaluate optimization of loading rates and frequencies for waste disposal by land treatment. Loading rates 3 to 13 weight percent and frequencies 1 to 12, respectively, per year were studied over an 18 month period. Total oil losses were proportional to the amount applied and averaged 54 percent over the study period. Saturates fraction loss was highest followed by aromatics, polars, and asphaltenes. Volatile losses were substantial at application, but relatively small over the long-term. Biodegradation of the oil followed first order kinetics with a rate coefficient of 0.003/day. Heavy metals were immobile in the top 30 cm zone of incorporation. Facility design factors are discussed relating to field equipment operation, oil percolation prevention, runoff control, and proper tillings.

515,113
PB85-152650/GAR PC **A06/MF A01**
S-Cubed, La Jolla, CA.
Liquid-Liquid Extraction of Trace Level Pesticides from Process Streams.
Final rept. Jun 82-Apr 83,
G. V. Hiler, and S. D. Cameron. Dec 84, 121p EPA/600/2-84/195
Contract EPA-68-02-3629
Portions of this document are not fully legible.

The report describes the further resolution of the feasibility of a process (liquid-liquid extraction for the treatment of pesticide manufacturing wastewater) that had been shown by earlier research to be competitive with existing methods of treatment. Eight experiments were conducted using the Solvent Extraction of Organic Pesticides (SEXOP) process to treat process effluent samples of 2,4-D and bromacil. Process modifications designed to optimize the SEXOP system for treating these effluents were developed and tested. Gas chromatography was used to compare treated effluent with the untreated starting material. Pesticide extraction efficiencies were calculated: results show that pesticide removal in excess of 98% is attainable during initial operation, and 70% on a steady-state basis for a single-pass system for both samples tested. Staging of extraction units and increased solvent/water ratios would be expected to optimize steady-state efficiencies above 90%. An economic analysis, projecting engineering cost estimates for both a large and a small commercial-scale SEXOP process, shows that a projected large SEXOP plant should be able to process 301 million gal./yr of effluent at an estimated cost of about $2 per 1,000 gal.

515,114
PB85-152973/GAR PC **A07/MF A01**
Westinghouse Research and Development Center, Pittsburgh, PA.
Particulate Emissions and Control in Fluidized-Bed Combustion: Modeling and Parametric Performance.
Final rept.,
A. Y. Ranadive, R. A. Newby, and D. F. Ciliberti. Jan 85, 147p EPA/600/7-85/002
Contract EPA-68-02-3110

The report discusses a model, developed to describe the physical characteristics of the particulates emitted from fluidized-bed combustion (FBC) systems and to evaluate data on FBC particulate control systems. The model, which describes the particulate emissions profile from FBC, considers the attrition of the bed material and the recycling of the elutriated fines in addition to other FBC phenomena. For a given combustor design and set of operating conditions, the particle profile program projects the mass rate and size distribution of the solids in the bed draw-off and carry-over streams, as well as those emitted from particle removal devices of any given configuration. Examples of particulate emission and control are given for both atmospheric-pressure and pressurized FBC systems. The effect of calcium-to-sulfur ratio, rate of sorbent attrition, superficial gas velocity, and recycle cyclone efficiency was examined by using the model. A manual for the particle profiles program comprising a quick-reference user's section, as well as a more detailed descriptive section, is provided in the full report.

515,115
PB85-854925/GAR PC **N01/MF N01**
National Technical Information Service, Springfield, VA.
Flue Gas Desulfurization. 1970-February 1985 (Citations from the Engineering Index Data Base).
Rept. for 1970-Feb 85.
Feb 85, 193p
Supersedes PB84-860303.

This bibliography contains citations concerning flue gas desulfurization (FGD) process design, evaluation, economic analysis, and application in power generation facilities. FGD system design, operation, assessment, maintenance, and failure due to corrosion are discussed. Chemical reactions in FGD systems and sulfur dioxide utilization from flue gas recovery are considered. (This updated bibliography contains 273 citations, 43 of which are new entries to the previous edition.)

515,116
PB85-854941/GAR PC **N01/MF N01**
National Technical Information Service, Springfield, VA.

Odor Pollution. 1977-February 1985 (Citations from the NTIS Data Base).
Rept. for 1977-Feb 85.
Feb 85, 130p
Supersedes PB84-860337.

This bibliography contains citations concerning odorous air pollutants, and odors and tastes in water. Sources include agricultural and livestock wastes, sewage sludge, industrial wastes, vehicular exhausts, hospitals, and polluted water streams. Treatment methods, environmental protection aspects, and human factors are discussed. (This updated bibliography contains 134 citations, 18 of which are new entries to the previous edition.)

515,117
PB85-855229/GAR PC **N01/MF N01**
National Technical Information Service, Springfield, VA.
Surface Transportation: Demands and Needs. 1980-February 1985 (Citations from the NTIS Data Base).
Rept. for 1980-Feb 85.
Feb 85, 224p
Supersedes PB83-805216.

This bibliography contains citations concerning long and short-term requirements of surface transportation. Topics include traffic forecasting on highways, waterways, and rail systems, long-range transportation planning strategies, and cost considerations of future requirements. Freight transport studies in urban areas and specific regions, and energy demands for surface transportation are also considered. (This updated bibliography contains 271 citations, 90 of which are new entries to the previous edition.)

515,118
PB85-914900/GAR Subscription
Department of Energy, Oak Ridge, TN. Technical Information Div.
Energy and the Environment: A Current Awareness Journal.
Monthly repts.
1985, 13 issues
Supersedes PB84-914900.
Paper copy available on subscription, North American Continent price $75.00/year; all others write for quote. Issued 13 times annually including a cumulative index. Single copies also available.

Energy and the Environment, a monthly publication, provides abstracting and indexing coverage of current scientific and technical reports, journal articles, conference papers and proceedings, books, patents, theses, and monographs from all sources on environmental biological aspects of energy. All citations announced in the publication, as well as other information, are included in the energy information data base of the U.S. Department of Energy's Technical Information Center. The subject areas covered include the atmospheric, aquatic, and terrestrial environments with emphasis on impacts of any energy-related activities on these environments. This includes transport, fate, and ecological-biological consequences of various pollutants, such as flue gas, NOx, SOx, hydrocarbons, CO2, thermal effluents, and radioactive isotopes. Reference to older information on environmental aspects of energy are included in the computerized information base.

13C. Construction Equipment Materials, and Supplies

515,119
AD-A149 091/1/GAR PC **A03/MF A01**
Army War Coll., Carlisle Barracks, PA.
Equipment Profiles for Major Items of Engineer Equipment.
Study project,
B. W. Springfield. May 84, 37p

The cost of equipping modern military forces has risen at almost exponential rates over the past decade. The increased reliance on sophisticated equipment to improve combat effectiveness and the initiation of the largest equipment modernization program in our military history has focused our attention on the equipment acquisition and allocation process. It is imperative that the military use it's limited resources wisely by properly structuring units with the proper items of equipment to accomplish the missions expected in the priority scenarios. The engineer equipment requirement profiles to support the maneuver force in a European Scenario were compared with support capabilities found in typical engineer support packages. It was found that typical engineer support packages do not contain the proper mix of equipment to efficiently accomplish the high priority support tasks needed by the maneuver force within the FCZ. A higher proportion of digging equipment is required in combat engineer units to accomplish the mix of survivability, countermobility, and mobility tasks that have been defined as priority needs. Equipment profiles for major engineer equipment items as well as initiatives for unit design improvements are identified in the study.

515,120
DE85000711/GAR PC **A02/MF A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Measurement of Fenestration Net Energy Performance: Considerations Leading to Development of the Mobile Window Thermal Test (MoWiTT) Facility.
J. H. Klems. Jul 84, 14p LBL-18144, CONF-841201-16
Contract AC03-76SF00098
ASME winter annual meeting, New Orleans, LA, USA, 9 Dec 1984.
Portions are illegible in microfiche products.

A detailed consideration of the energy flows entering the energy balance on a building space and the effect of random measurement errors on the determination of fenestration performance is presented. Estimates of the error magnitudes are made for a passive test cell and it is shown that a more accurate test facility is necessary for reliable measurements on fenestration systems with thermal resistance in the range 2 to 10 times that of single glazing or shading coefficient less than 0.7. A test facility of this type, the MoWiTT, which has been built at Lawrence Berkeley Laboratory, is described. The effect of random errors in the MoWiTT is discussed and computer calculations of its performance are presented. The discussion shows that, for any measurement facility, random errors are most serious for nighttime measurements, while systematic errors are most important for daytime measurements. It is concluded that, for the MoWiTT, errors from both sources are expected to be small. (ERA citation 10:000801)

515,121
DE85002300/GAR PC **A02/MF A01**
Union Carbide Corp., Oak Ridge, TN. Computer Sciences Div.
Investigation of Factors Influencing Infrared Roof Moisture Surveys Using a Mathematical Model.
K. W. Childs, G. E. Courville, and P. W. Childs. 1983, 14p CONF-8310218-2
Contract AC05-84OR21400
11. Society of Optical Engineers conference on thermosense, Chicago, IL, USA, 2 Oct 1983.
Portions are illegible in microfiche products.

In low sloped roofing systems using porous insulation, the presence of water can significantly degrade thermal performance. Because of the different thermal characteristics of wet and dry insulation, there is often a surface temperature differential between areas of wet and dry insulation. Under the right circumstances, the areas of wet insulation can be detected by means of infrared sensing techniques. To better define the conditions under which infrared techniques can distinguish between areas of wet and dry insulation, a mathematical model was developed. This model is a one-dimensional, transient heat transfer model of a roofing system. The model considers conduction through the roof, insolation, radiant exchange between roof and sky, convective heat transfer between the roof and air, and the influence of moisture trapped in insulation. For one particular roof system, a parametric study was undertaken using this model to determine the influence of moisture content, outside air temperature, wind speed, insolation, sky temperature, and other factors on the roof surface temperature. Preliminary recommendations for employing thermal sensing techniques to locate wet insulation are developed. (ERA citation 10:002508)

515,122
PB85-139855/GAR PC **E03/MF E03**
Timber Research and Development Association, High Wycombe (England).
Structural Use of Chipboard for Flooring: State of the Art Report.
Research rept.
Dec 83, 20p RR-6/83

This report is intended to provide guidance for structural engineers on currently available design data, with reference to where more detailed information may be obtained.

515,123
PB85-143808/GAR PC **A12/MF A01**
Florida Agricultural and Mechanical Univ., Tallahassee. School of Architecture.
Manual for Building Temporary Emergency Shelters (Manual para la Construccion de Abrigos de Emergencia Temporales) (Manuel pour la Construction des Abris D'Urgence Temporaires) (Kitab li bina Ma'Wa Muwagat fil Halat at Tawara),
B. Frazier, and L. W. Birch. 1 Sep 82, 268p AID-PN-AAM-288
Text in English, Spanish, French and Arabic.

Detailed, illustrated instructions for selecting, designing, and constructing temporary postdisaster shelters using plastic sheeting as a primary construction material are presented in this manual. Building designs for environmental conditions such as strong winds, earthquakes, temperature extremes, and flooding are described, along with dimensions and room layouts for community service buildings. Instructions are provided for building different types of structures, for constructing foundations, walls, roofs, doors, windows, and vents, and for attaching plastic to various other materials used in construction.

515,124
PB85-152817/GAR PC **A05/MF A01**
Foster-Miller, Inc., Waltham, MA.
Development of Soft Excavation Techniques, Phases 2 and 2A.
Annual rept. Mar 82-Mar 83,
D. Atkinson, and J. Megahan. Jun 83, 94p GRI-81/0184
Contract GRI-5080-353-0337
See also PB83-126052.

The information in this report covers the work accomplished in Phases II and IIA of the subject contract. Twenty alternative soft excavation concepts were evaluated for improved spoil removal. Meetings with GRI and members of their Advisory Group indicated that a vacuum system would still be favored providing that the clogging problem could be drastically reduced. A hose within a hose concept was developed which provided a fluidized interior hose wall. A full-scale double wall vacuum pipe that can remove excavated soil without clogging has been designed, built and tested. A moveable hopper for collecting the excavated soil was designed and fabricated. The hopper will be suspended from a modified backhoe arm which will be attached to the Brooklyn Union Gas vacuum truck that has been loaned to the program. This will allow the use of a much shorter vacuum hose which will further increase the chance of success for the subsequent field tests. The hand-held, hydraulically operated rotary excavator was tested extensively. It removes soil efficiently without causing damage to plastic pipes or other buried cables.

13E. Couplings, Fittings, Fasteners, and Joints

515,125
AD-A149 010/1/GAR PC **A04/MF A01**
National Materials Advisory Board (NRC), Washington, DC.
Reliability of Adhesive Bonds Under Severe Environments. Report of the Committee on Reliability of Adhesive Bonds in Severe Environments.
Final rept. 1 Feb 84-31 Jul 85.
1 Dec 84, 60p Rept no. NMAB-422
Contract MDA903-82-C-0434

A workshop organized by a National Research Council committee and entitled 'Reliability of Adhesive Bonds in Severe Environments' was attended by about 100 invited experts. The detailed findings, reported herein, include the recommendation that the federal government spearhead a major effort to overcome the open

issues that currently prevent the reliable structural use of adhesive bonding in severe environments. A pervasive comment was that the interdisciplinary nature of the subject requires close interaction of the experts on the chemistry, interphase science, and mechanics of adhesive bonds.

13F. Ground Transportation Equipment

515,126
DE84770472/GAR PC A08/MF A01
Ingenieurhochschule Zwickau (German D.R.).
Fuel Savings by Advanced Vehicle Drive Systems.
F. Meissner. 1980, 164p CONF-8004243-
In German.Conference on fuel-saving driving systems, Zwickau, German D.R. 17 Apr 1980.
U.S. Sales Only. Portions are illegible in microfiche products.

Separate abstracts were prepared for individual papers. (ERA citation 09:050076)

515,127
DE85002233/GAR PC A02/MF A01
Argonne National Lab., IL.
Freight Network Equilibrium Model Revisited: The Freight Network Modeling System.
R. L. Tobin. 1984, 22p CONF-8410102-1
Contract W-31-109-ENG-38
Coal transportation costing and modelling seminar, Kansas City, MO, USA, 15 Oct 1984.
Portions are illegible in microfiche products.

The Freight Network Equilibrium Model (FNEM) was developed to study potential coal transportation impacts that could result from widespread conversion of boilers to use coal for fuel, as mandated under the Powerplant and Industrial Fuel Use Act of 1978. Continued improvement of FNEM and creation of auxiliary software and data during applications of the model in various transportation analyses led to the development of the Freight Network Modeling System, a general and flexible modeling system designed to have wide applicability to a variety of freight transportation analyses. It consists of compatible network data bases, data management software, models of freight transportation, report generators, and graphics output. The network data include US rail, water, highway, and pipeline systems. Data management software automates the task of setting up a study network of appropriate detail in appropriate regions of the country. The major analytical tools in the system are FNEM and Shortest Path Analysis and Display (SPAD); FNEM is predictive and simulates decisions of both shippers and carriers, taking into account the competition for transportation facilities; SPAD is a simpler model that optimizes routings of single shipments. Output for both FNEM and SPAD includes detailed routings, cost and delay estimates for all shipments, and data on total traffic levels. SPAD can be used interactively with routes displayed graphically. 13 references, 10 figures, 2 tables. (ERA citation 10:001817)

515,128
N85-13652/1/GAR PC A05/MF A01
Allgemeine Elektricitaets-Gesellschaft AEG Telefunken, Ulm (Germany, F.R.).
Investigation and Development of Multicolored Liquid Crystal Display Systems for Automotive Dashboard Application and Large Format Information Boards.
Final Report, Mar. 1983.
J. Briegel, K. Fahrenschon, R. Ostwald, G. Schubert, and H. Suessenbach. Sep 84, 86p BMFT-FB-T-84-187
In German; English Summary. Sponsored by Bundesministerium fuer Forschung und Technologie.

The manufacturing technology for large area twisted nematic displays with direct and 1:2 multiplex drive was developed. This includes special technologies for integrating the drives IC's into the front glases of the display. The manufacturing procedures were selected to be directly applicable for automated large quantity series production. Negative displays showing bright (colorless or colored) segments on a dark background were investigated. They require tighter production tolerances but show the brighter images required for car dashboards, test equipment, information boards, military equipment, avionic instrumentation, and medical equipment.

515,129
PB85-136372/GAR PC A05/MF A01
Calspan Advanced Technology Center, Buffalo, NY.
Effects of Side Impact Padding on Driver Performance.
Final rept. Sep 81-Jan 84,
A. S. Baum, V. J. Gawron, and K. N. Naab. Jan 84, 97p CALSPAN-6970-V-1, DOT-HS-806 628
Contract DTNH22-C-81-07256

A three phase study was undertaken to design and evaluate an acceptable side door padding panel which did not degrade the driver's ability to control a vehicle. In Task 1, drivers' lateral clearance requirements were determined by filming test subjects performing a representative series of driving maneuvers. The films were digitized to create time histories of the left elbow, from which a padding design concept was derived. In Task 2, two prototype test panels were fabricated from the design concept developed in Task 1 and tested. Finally, a brief consumer survey was accomplished, in an effort to obtain estimates of the likelihood that vehicles with similar side door panels would be accepted in the marketplace.

515,130
PB85-136513/GAR PC$51.00/MF$14.50
American Motors Corp., Detroit, MI.
Application for Certification 1985 Model Year Light-Duty Vehicles - American Motors Corporation - Renault.
1984, 592p EPA/460/A-85/1
See also PB81-166027, and PB85-136521.
Also available in set of 12 reports PC E99, PB85-136505.

Every year, each manufacturer of passenger cars, light-duty trucks, motorcycles, or heavy-duty engines submits to EPA an application for certification. In the application, the manufacturer gives a detailed technical description of the vehicles or engines he intends to market during the upcoming model year. These engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems and exhaust and evaporative emission control systems. It also provides information on emission test procedures, service accumulation procedures, fuels to be used, and proposed maintenance requirements to be followed during testing. Section 16 of the application contains the results of emission testing, a statement of compliance to the regulations, production engine parameters, and a Summary Sheet Input Form on which issuance of a Certificate of Conformity is based.

515,131
PB85-136521/GAR PC$60.50/MF$14.80
BMW of North America, Inc., Montvale, NJ.
Application for Certification 1985 Model Year Light-Duty Vehicles - BMW AG.
1984, 751p EPA/460/A-85/2
See also PB84-124411, PB85-136513, and PB85-136539.
Also available in set of 12 reports PC E99, PB85-136505.

Every year, each manufacturer of passenger cars, light-duty trucks, motorcycles, or heavy-duty engines submits to EPA an application for certification. In the application, the manufacturer gives a detailed technical description of the vehicles or engines he intends to market during the upcoming model year. These engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems and exhaust and evaporative emission control systems. It also provides information on emission test procedures, service accumulation procedures, fuels to be used, and proposed maintenance requirements to be followed during testing. Section 16 of the application contains the results of emission testing, a statement of compliance to the regulations, production engine parameters, and a Summary Sheet Input Form on which issuance of a Certificate of Conformity is based.

515,132
PB85-136539/GAR PC$219.00/MF$22.60
Chrysler Corp., Detroit, MI.
Application for Certification 1985 Model Year Light-Duty Vehicles - Chrysler.
1984, 3232p EPA/460/A-85/3
See also PB84-124429, PB85-136521, and PB85-136547.
Also available in set of 12 reports PC E99, PB85-136505.

Every year, each manufacturer of passenger cars, light-duty trucks, motorcycles, or heavy-duty engines submits to EPA an application for certification. In the application, the manufacturer gives a detailed technical description of the vehicles or engines he intends to market during the upcoming model year. These engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems and exhaust and evaporative emission control systems. It also provides information on emission test procedures, service accumulation procedures, fuels to be used, and proposed maintenance requirements to be followed during testing. Section 16 of the application contains the results of emission testing, a statement of compliance to the regulations, production engine parameters, and a Summary Sheet Input Form on which issuance of a Certificate of Conformity is based.

515,133
PB85-136547/GAR PC$134.50/MF$18.40
General Motors Proving Ground, Milford, MI.
Application for Certification 1985 Model Year Light-Duty Vehicles - General Motors.
1984, 1905p EPA/460/A-85/4
See also PB84-124445, PB85-136539, and PB85-136554.
Also available in set of 12 reports PC E99, PB85-136505.

Every year, each manufacturer of passenger cars, light-duty trucks, motorcycles, or heavy-duty engines submits to EPA an application for certification. In the application, the manufacturer gives a detailed technical description of the vehicles or engines he intends to market during the upcoming model year. These engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems and exhaust and evaporative emission control systems. It also provides information on emission test procedures, service accumulation procedures, fuels to be used, and proposed maintenance requirements to be followed during testing. Section 16 of the application contains the results of emission testing, a statement of compliance to the regulations, production engine parameters, and a Summary Sheet Input Form on which issuance of a Certificate of Conformity is based.

515,134
PB85-136554/GAR PC$55.00/MF$14.50
Mazda (North America), Inc., Farmington Hills, MI.
Application for Certification 1985 Model Year Light-Duty Vehicles - Mazda.
1984, 662p EPA/460/A-85/5
See also PB84-124478, PB85-136547, and PB85-136562.
Also available in set of 12 reports PC E99, PB85-136505.

Every year, each manufacturer of passenger cars, light-duty trucks, motorcycles, or heavy-duty engines submits to EPA an application for certification. In the application, the manufacturer gives a detailed technical description of the vehicles or engines he intends to market during the upcoming model year. These engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems and exhaust and evaporative emission control systems. It also provides information on emission test procedures, service accumulation procedures, fuels to be used, and proposed maintenance requirements to be followed during testing. Section 16 of the application contains the results of emission testing, a statement of compliance to the regulations, production engine parameters, and a Summary Sheet Input Form on which issuance of a Certificate of Conformity is based.

515,135
PB85-136562/GAR PC$50.00/MF$14.50
Mercedes-Benz of North America, Inc., Montvale, NJ.

Application for Certification 1985 Model Year Light-Duty Vehicles - Mercedes-Benz.
1984, 582p EPA/460/A-85/6
See also PB84-124486, PB85-136554, and PB85-136570.
Also available in set of 12 reports PC E99, PB85-136505.

Every year, each manufacturer of passenger cars, light-duty trucks, motorcycles, or heavy-duty engines submits to EPA an application for certification. In the application, the manufacturer gives a detailed technical description of the vehicles or engines he intends to market during the upcoming model year. These engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems and exhaust and evaporative emission control systems. It also provides information on emission test procedures, service accumulation procedures, fuels to be used, and proposed maintenance requirements to be followed during testing. Section 16 of the application contains the results of emission testing, a statement of compliance to the regulations, production engine parameters, and a Summary Sheet Input Form on which issuance of a Certificate of Conformity is based.

515,136
PB85-136570/GAR PC**$53.00**/MF**$14.50**
Mitsubishi Motors Corp., Tokyo (Japan).
Application for Certification 1985 Model Year Light-Duty Vehicles - Mitsubishi.
1984, 632p EPA/460/A-85/7
See also PB84-124494, PB85-136562, and PB85-136588.
Also available in set of 12 reports PC E99, PB85-136505.

Every year, each manufacturer of passenger cars, light-duty trucks, motorcycles, or heavy-duty engines submits to EPA an application for certification. In the application, the manufacturer gives a detailed technical description of the vehicles or engines he intends to market during the upcoming model year. These engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems and exhaust and evaporative emission control systems. It also provides information on emission test procedures, service accumulation procedures, fuels to be used, and proposed maintenance requirements to be followed during testing. Section 16 of the application contains the results of emission testing, a statement of compliance to the regulations, production engine parameters, and a Summary Sheet Input Form on which issuance of a Certificate of Conformity is based.

515,137
PB85-136588/GAR PC**$120.50**/MF**$17.80**
Nissan Motor Co. Ltd., Yokohama (Japan).
Application for Certification 1985 Model Year Light-Duty Vehicles - Nissan.
1984, 1667p EPA/460/A-85/8
See also PB84-178078, PB85-136570, and PB85-136596.
Also available in set of 12 reports PC E99, PB85-136505.

Every year, each manufacturer of passenger cars, light-duty trucks, motorcycles, or heavy-duty engines submits to EPA an application for certification. In the application, the manufacturer gives a detailed technical description of the vehicles or engines he intends to market during the upcoming model year. These engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems and exhaust and evaporative emission control systems. It also provides information on emission test procedures, service accumulation procedures, fuels to be used, and proposed maintenance requirements to be followed during testing. Section 16 of the application contains the results of emission testing, a statement of compliance to the regulations, production engine parameters, and a Summary Sheet Input Form on which issuance of a Certificate of Conformity is based.

515,138
PB85-136596/GAR PC**$99.50**/MF**$16.90**
Peugeot Motors of America, Inc., Lyndhurst, NJ.
Application for Certification 1985 Model Year Light-Duty Vehicles - Peugeot.
1984, 1403p EPA/460/A-85/9
See also PB84-124502, PB85-136588, and PB85-136604.
Also available in set of 12 reports PC E99, PB85-136505.

Every year, each manufacturer of passenger cars, light-duty trucks, motorcycles, or heavy-duty engines submits to EPA an application for certification. In the application, the manufacturer gives a detailed technical description of the vehicles or engines he intends to market during the upcoming model year. These engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems and exhaust and evaporative emission control systems. It also provides information on emission test procedures, service accumulation procedures, fuels to be used, and proposed maintenance requirements to be followed during testing. Section 16 of the application contains the results of emission testing, a statement of compliance to the regulations, production engine parameters, and a Summary Sheet Input Form on which issuance of a Certificate of Conformity is based.

515,139
PB85-136604/GAR PC**$59.50**/MF**$14.80**
SAAB-Scania of America, Inc., Orange, CT.
Application for Certification 1985 Model Year Light-Duty Vehicles - Saab-Scania.
1984, 740p EPA/460/A-85/10
See also PB84-124528, PB85-136596, and PB85-136612.
Also available in set of 12 reports PC E99, PB85-136505.

Every year, each manufacturer of passenger cars, light-duty trucks, motorcycles, or heavy-duty engines submits to EPA an application for certification. In the application, the manufacturer gives a detailed technical description of the vehicles or engines he intends to market during the upcoming model year. These engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems and exhaust and evaporative emission control systems. It also provides information on emission test procedures, service accumulation procedures, fuels to be used, and proposed maintenance requirements to be followed during testing. Section 16 of the application contains the results of emission testing, a statement of compliance to the regulations, production engine parameters, and a Summary Sheet Input Form on which issuance of a Certificate of Conformity is based.

515,140
PB85-136612/GAR PC**$75.00**/MF**$15.70**
Toyota Motor Co. Ltd., Secaucus, NJ.
Application for Certification 1985 Model Year Light-Duty Vehicles - Toyota.
1984, 999p EPA/460/A-85/11
See also PB84-124536, PB85-136604, and PB85-136620.
Also available in set of 12 reports PC E99, PB85-136505.

Every year, each manufacturer of passenger cars, light-duty trucks, motorcycles, or heavy-duty engines submits to EPA an application for certification. In the application, the manufacturer gives a detailed technical description of the vehicles or engines he intends to market during the upcoming model year. These engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems and exhaust and evaporative emission control systems. It also provides information on emission test procedures, service accumulation procedures, fuels to be used, and proposed maintenance requirements to be followed during testing. Section 16 of the application contains the results of emission testing, a statement of compliance to the regulations, production engine parameters, and a Summary Sheet Input Form on which issuance of a Certificate of Conformity is based.

515,141
PB85-136620/GAR PC**$197.00**/MF**$21.40**
Volkswagen of America, Inc., Ann Arbor, MI.
Application for Certification 1985 Model Year Light-Duty Vehicles - Volkswagen-Audi.
1984, 2863p EPA/460/A-85/12
See also PB81-200206, and PB85-136612.
Also available in set of 12 reports PC E99, PB85-136505.

Every year, each manufacturer of passenger cars, light-duty trucks, motorcycles, or heavy-duty engines submits to EPA an application for certification. In the application, the manufacturer gives a detailed technical description of the vehicles or engines he intends to market during the upcoming model year. These engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems and exhaust and evaporative emission control systems. It also provides information on emission test procedures, service accumulation procedures, fuels to be used, and proposed maintenance requirements to be followed during testing. Section 16 of the application contains the results of emission testing, a statement of compliance to the regulations, production engine parameters, and a Summary Sheet Input Form on which issuance of a Certificate of Conformity is based.

515,142
PB85-149557/GAR
(Order as PB85-149532/GAR, PC **E06**/MF **E01**)
Toshiba Corp., Tokyo (Japan).
Color-Liquid-Crystal Display for Automotive Instrument Panel,
M. Kawamoto, K. Mizunoya, and M. Kinoshita.
c1984, 4p
Text in Japanese.
Included in Toshiba Review, v39 n12 p1071-1074 1984.

Contrivance has been made for improving the display performance of liquid-crystal display on the automotive instrument panel. The use of the guest-host type liquid-crystal display has realized higher contrast and luminance and wider viewing angle as compared with the conventional twist type liquid-crystal. To be added, the cold cathode discharge lamp used in combination with the color filter has improved the clarity of color display; the incorporation of a heater has raised the responsing speed at low temperature.

515,143
PB85-855062/GAR PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Automotive Electronics and Electronic Systems. 1975-February 1985 (Citations from the INSPEC: Information Services for the Physics and Engineering Communities Data Base).
Rept. for 1975-Feb 85.
Feb 85, 220p
Supersedes PB84-860436.

This bibliography contains citations concerning various aspects of automotive electronics and its applications. Many citations refer to microprocessor technology for automobile engine control systems. Some citations refer to automotive diagnositics, protection, and servicing. The status and trends of automotive electronics are considered on a world-wide basis. (This updated bibliography contains 303 citations, 46 of which are new entries to the previous edition.)

515,144
PB85-855252/GAR PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Microprocessors Used in Motor Vehicles. 1975-February 1985 (Citations from the INSPEC: Information Services for the Physics and Engineering Communities Data Base).
Rept. for 1975-Feb 85.
Feb 85, 155p
Supersedes PB84-861228.

This bibliography contains citations concerning the utilization of microprocessors in automobiles and trucks. Topics include the control of engine function, emissions, and transmission. The use of microprocessors in instrumentation and testing of various components is also discussed. (This updated bibliography contains 194 citations, 26 of which are new entries to the previous edition.)

13H. Industrial Processes

515,145
AD-A148 972/3/GAR PC **A04**/MF **A01**
Georgia Inst. of Tech., Atlanta. Energy and Material Sciences Lab.

Program to Develop Thermite Reactions to Produce Refractory Borides and Carbides.
Interim rept. 1 Jun 83-31 Jan 84.
K. V. Logan, and J. D. Walton. Sep 84, 63p AMMRC-TR-84-38
Contract DAAG46-83-K-0163

The objective of this research program is to determine the potential of the thermite reaction for producing high density refractory boride shapes by melt casting. Emphasis is being placed on developing experimental compositions, processing procedures and ignition conditions which will maximize the temperature obtained from the thermite reaction and affect the melting and separation of the reaction products. Phase I of the research effort evaluated the effects of three process parameters: particle size, powder compaction and temperature of reactants at ignition. The products of ignition were characterized using electron microscopy and X-ray diffraction to determine the extent of the reaction towards completion and the compounds produced by the ignition. Three systems were investigated: TiO2 + Al; B2O3 + Al; and TiO2 + B2O3 + Al. A TiB2 + alpha Al2O3 product was obtained by using the thermite reaction to reduce TiO2 + B2O3. Samples containing small particle size aluminum in a loose powder ignited at a lower temperature than compacted samples containing coarse aluminum. Samples ignited in a preheated furnace showed a more complete reaction than those ignited at room temperature.

515,146
AD-A149 027/5/GAR PC **A06**/MF **A01**
Advisory Group for Aerospace Research and Development, Neuilly-sur-Seine (France).
Process Modeling Applied to Metal Forming and Thermomechanical Processing.
J. F. Thomas, B. Andersson, J. E. Tibballs, B. Baudelet, and J-P. Immarigeon. Sep 84, 164p Rept no. AGARD-LS-137

This Lecture Series considers process modeling which provides a new perspective to advance metal forming and thermo-mechanical processing. Working and forming processes are viewed as systems which integrate component behaviour such as workpiece flow, heat flow and friction at the workpiece-tooling interface, and microstructural evolution. These are combined to form a system process model using deformation mechanics. The Lecture Series covers extrusion, forging, rolling, and sheet forming processes. It will provide specific results for light metals, steels and superalloys and introduce finite element methods and related aspects of computer-aided process design. The Lecture Series was sponsored by the Structures and Materials Panel and organized by the Consultant and Exchange Program of AGARD.

515,147
DE85000085/GAR PC **A02**/MF **A01**
Washington Univ., St. Louis, MO. Edward Mallinckrodt Inst. of Radiology.
High Resolution Computed Tomography for Solid Modeling and Computer Aided Design.
M. W. Vannier, D. M. Dye, R. H. Knapp, D. E. Gayou, and N. P. Sammon. Sep 84, 7p CONF-8408115-1
Contract W-31-109-ENG-38
Topical meeting on industrial applications of computed tomography and NMR imaging, Hecla Island, Manitoba, Canada, 13 Aug 1984.
Portions are illegible in microfiche products.

Input of solid objects to a CAD/CAM system has been accomplished using serial sections and 3-D surface reconstructions obtained with an unmodified medical CT scanner. (ERA citation 10:001014)

515,148
N85-13085/4/GAR PC **A03**/MF **A01**
Societe Nationale Industrielle Aerospatiale, Paris (France).
L'Electroformage du Nickel (Electroforming of Nickel).
G. Dunwaud. 1984, 26p SNIAS-841-501-101
Text in French.

Nickel electroforming applications to aeronautical construction materials are examined. The properties of electroformed nickel are discussed. The ease with which it can be used to manufacture complex geometry bodies, the excellent mechanical and chemical properties and the moderate cost are advantages of the technique.

515,149
N85-13156/3/GAR PC **A05**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Procedures for Precap Visual Inspection.
1984, 81p NAS 1.61:1122, NASA-RP-1122

Screening procedures for the final precap visual inspection of microcircuits used in electronic system components are described as an aid in training personnel unfamiliar with microcircuits. Processing techniques used in industry for the manufacture of monolithic and hybrid components are presented and imperfections that may be encountered during this inspection are discussed. Problem areas such as scratches, voids, adhesions, and wire bonding are illustrated by photomicrographs. This guide can serve as an effective tool in training personnel to perform precap visual inspections efficiently and reliably.

515,150
N85-13168/8/GAR PC **A05**/MF **A01**
Centre National d'Etudes Spatiales, Toulouse (France).
Conception de Circuits Assistee Par Ordinateur: Realisation de Masques pour l'Elaboration de Circuits Microondes (Computerized Circuit Designs: Realization of Masks to Manufacture Microwave Circuits).
J. L. Sedard, and L. Lapierre. Aug 83, 82p CNES-NT-107
In French; English Summary.

A computer and its graphical peripherals (cathode tracer COM 330) were used to produce directly a full scale printed circuit mask on 35 mm film. High precision equipment is not essential, since circuit parameters are required with an accuracy far lower than that of the apparatus used to produce the mask. The production and control by the definition tests (line width, spacing); the trace program versus user data; applications and examples, and visualization procedures are discussed.

515,151
N85-13219/9/GAR PC **A05**/MF **A01**
Fraunhofer-Gesellschaft zur Foerderung der Angewandten Forschung e.V., Munich (Germany, F.R.). Inst. fuer Festkoerpertechnologie.
Ion Beam Lithography.
Final Report, Mar. 1983.
K. Haberger, H. Ryssel, and H. Kranz. Sep 84, 95p BMFT-FB-T-84-182
In German; English Summary. Sponsored by Bundesministerium fuer Forschung und Technologie.

The physical possibilities of ion beam lithography were investigated with regard to its technical applicability. Resists were evaluated concerning their suitability for ion-beam exposure, the compatibility of ion beam exposure with standard semiconductor processing for direct wafer exposure, and the focusing of intense ion beams into small spots. Based on an available focusing system, a fine-focus unit with a gallium field-emission source was constructed. With this unit gallium ions of up to 50 keV can be focused into a spot of 0.7 micron diameter.

515,152
N85-13252/0/GAR PC **A07**/MF **A01**
Centre Technique des Industries Mecaniques, Saint-Etienne (France).
Conduite d'Une Cellule Flexible d'Usinage (Design of a Flexible Machining System).
Final Report.
J. F. Coudurier. Jan 84, 130p CETIM-1-3E-140
Text in French.

An automatic machining system was designed to operate with arbitrary sequences of axisymmetric pieces. The system is implemented with an inlet conveyor, a numerical controlled lathe, an outlet conveyor and a robot which assures the servicing of the various system elements. Control of machined pieces is carried out by a laser scanning meter. The computer programs and algorithms utilized are described. System management for real time operation is detailed.

515,153
N85-13258/7/GAR PC **A04**/MF **A01**
Centre National d'Etudes Spatiales, Toulouse (France).
Fiabilite Composants et Technologies d'Assemblage (Component Reliability and Assembling Technologies).
F. Linder. Sep 83, 68p CNES-NT-108
In French; English Summary.

Space application electronic packaging procedures are discussed. Activities in project support, technical studies and evaluation-qualification are detailed. Electronic packaging options are described.

515,154
PB85-138774/GAR PC **E04**/MF **E04**
Central Electricity Generating Board, Southampton (England). Technology Planning and Research Div.
Shape of the Fusion Boundary in an Electromagnetically Stirred Weld Pool,
R. E. Craine, and J. G. Andrews. c1984, 34p TPRD/M/1355/N84

It has long been suspected that the motion of the molten metal in a weld pool can have a pronounced effect on the shape of the fusion boundary. Existing theoretical models of the heat flow in welding processes ignore any such motion, apart from the uniform motion of the workpiece relative to the welding arc. The note considers a weld pool which is stirred by electromagnetic body forces due to the electric current flow in the metal and solves the coupled equations of fluid flow and heat flow to determine the shape of the fusion boundary. It is found that the shape of the boundary depends significantly on the distribution of current entering the pool. Other effects causing fluid flow, such as buoyancy and surface tension, need to be considered before accurate predictions can be made.

515,155
PB85-138824/GAR PC **A22**/MF **A01**
Office of Technology Assessment, Washington, DC.
Computerized Manufacturing Automation: Employment, Education, and the Workplace. Volume 2. Working Papers. Part A: Case Studies on the Introduction of Programmable Automation in Manufacturing: Work Environment Effects. Part B: Final Report: Education and Training Case Study Series.
Jun 84, 506p
See also PB85-138832.

These working papers contain papers written for OTA to assist in preparation of the report Computerized Manufacturing Automation: Employment, Education and the Workplace. The contents include: Case studies on the introduction of programmable automation in manufacturing: work environment effects and Final report: Education and training case study series.

515,156
PB85-138832/GAR PC **A99**/MF **A01**
Office of Technology Assessment, Washington, DC.
Computerized Manufacturing Automation: Employment, Education, and the Workplace. Volume 2. Working Papers. Part C: Individual Education and Training Case Studies.
Jul 84, 615p
See also PB84-196500, and PB85-138824.

These working papers contain papers written for OTA to assist in preparation of the report: Computerized Manufacturing Automation: Employment, Education and the Workplace. The contents include: individual education and training case studies.

515,157
PB85-144202/GAR PC **E07**/MF **E07**
Plastics and Rubber Inst., London (England).
Automate or Liquidate Conference Held at the Metropole Hotel, Brighton on May 16-18, 1984.
May 84, 160p

The aim of the conference is to examine the plastics and rubber factory and industry of the future and to identify the disadvantages and benefits of all aspects of automation. The accompanying exhibition is designed to afford delegates the opportunity of direct discussion of automation with a wide cross-section of manufacturers.

515,158
PB85-144210/GAR PC **E06**/MF **E06**
Plastics and Rubber Inst., London (England).
New Markets Through Improved Performance, Reinforced Thermoset Injection International Conference Held at the Library Theatre, Solihull on October 9-10, 1984.
Oct 84, 106p

The conference aims to survey new markets, new applications and possibilities for improvements of exist-

ing markets. Case studies will be considered which are of particular use to moulders and those involved in materials selection. Developments in processing machinery for increased productivity and reduced fiber breakage will be covered. The conference will be of particular interest to materials suppliers, processors, designers and those involved in materials selection.

515,159
PB85-854875/GAR PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Flexible Manufacturing Systems. March 1984-February 1985 (Citations from the INSPEC: Information Services for the Physics and Engineering Communities Data Base).
Rept. for Mar 84-Feb 85.
Feb 85, 170p
Supersedes PB84-861202.

This bibliography contains citations concerning theory, economics, and applications of flexible manufacturing systems. Fundamental principles, development assessment, manufacturing computer control, and robotization technology are discussed. Prospects, development trends, and product inspection techniques are considered. (This updated bibliography contains 229 citations, all of which are new entries to the previous edition.)

515,160
PB85-855047/GAR PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Reactive Ion Etching and Reactive Sputter Etching. 1976-February 1985 (Citations from the INSPEC: Information Services for the Physics and Engineering Communities Data Base).
Rept. for 1976-Feb 85.
Feb 85, 280p
Supersedes PB84-860147.

This bibliography contains citations concerning techniques and applications of reactive ion and sputter etching. Applications include integrated circuit manufacture, semiconductor technology, and surface acoustic wave devices. Etching ion sources, processes, damage, contamination, compatibility, and characteristics are discussed. (This updated bibliography contains 357 citations, 75 of which are new entries to the previous edition.)

515,161
PB85-855419/GAR PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Reaction Injection Molding. 1970-February 1985 (Citations from the U. S. Patent Data Base).
Rept. for 1970-Feb 85.
Feb 85, 51p

This bibliography contains citations of selected patents concerning innovations and applications in reaction injection molding. Compositions for RIM molding, plasticizers, mold release agents and chain extenders are among the topics discussed. Processing techniques and parameters, and the design, development and performance of such equipment as mixing heads and injectors are also included. (Contains 52 citations fully indexed and including a title list.)

13I. Machinery and Tools

515,162
AD-A148 956/6/GAR PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Artificial Intelligence Lab.
Planning of Minimum-Time Trajectories for Robot Arms.
Memorandum rept.,
G. Sahar, and J. M. Hollerbach. Nov 84, 25p Rept no. AIM-804
Contracts N00014-81-C-0494, N00014-80-C-0505
Sponsored in part by Contract N00014-82-K-0334

The minimum-time path for a robot arm has been a long-standing and unsolved problem of considerable interest. We present a general solution to this problem that involves joint-space tesselation, a dynamic time-scaling algorithm, and graph search. The solution incorporates full dynamics of movement and actuator constraints, and can be easily extended for joint limits and workspace obstacles, but is subject to the particular tesselation scheme used. The results presented show that, in general, the optimal paths are not straight lines, but rather curves in joint-space that utilize the dynamics of the arm and gravity to help in moving the arm faster to its destination. Implementation difficulties due to the tesselation and to combinatorial proliferation of paths are discussed.

515,163
AD-A148 962/4/GAR PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Artificial Intelligence Lab.
Simplified Grasping and Manipulation with Dextrous Robot Hands.
Memorandum rept.,
R. S. Fearing. Nov 84, 18p Rept no. AI-M-809
Contract F33615-82-K-5108

A method is presented for stably grasping 2 dimensional polygonal objects with a dextrous hand when object models are not available. Basic constraints on object vertex angles are found for feasible grasping with two fingers. Local tactile information can be used to determine the finger motion that will reach feasible grasping locations. With an appropriate choice of finger stiffness, a hand can automatically grasp these objects with two fingers. The bounded slip of a part in a hand is shown to be valuable for adapting the fingers and object to a stable situation. Examples are given to show the ability of this grasping method to accommodate disturbance forces and to perform simple part reorientations and regrasping operations.

515,164
AD-A149 038/2/GAR PC **A02**/MF **A01**
Machine Design Engineers, Inc., Kent, WA.
Development of a Prototype Flat Winding Machine for Winding Air Deployed Fiberoptic Cable.
Interim rept. for period ending Nov 84,
V. D. Goodwin. 11 Dec 84, 14p
Contract N00014-84-C-0769

This interim report covers the progress for the first month of efforts to develop a machine for flat winding fiber optic cable intended for air deployment. This new winding technology involves winding the cable into a spool shape by winding successive flat layers (pancake style) which are placed on top of one another. This report includes a description of the 'kick off' meeting held at the Machine Design Engineers offices, technical objectives of the project as they are understood at this time, and a schedule of milestones to be accomplished during the course of the project.

515,165
N85-13233/0/GAR PC **A02**/MF **A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Effect of Two Inner-Ring Oil-Flow Distribution Schemes on the Operating Characteristics of a 35 Millimeter Bore Ball Bearing to 2.5 Million Dn.
F. T. Schuller, S. I. Pinel, and H. R. Signer. Jan 85, 14p NAS 1.60:2404, E-2127, NASA-TP-2404
Contract NAS3-19779

Parametric tests were conducted with a 35-mm-bore, split-inner-ring ball bearing with a double-inner-land-guided cage. Provisions were made for through-the-inner-ring lubrication. Test conditions were either a thrust load of 667 N (150 lb) or a combined load of 667 N (150 lb) thrust and 222 N (50 lb) radial, shaft speeds from 32000 to 72000 rpm, and an oil-inlet temperature of 394 K (250 deg F). Outer ring cooling was used in some tests. Tests were run with either 50 or 75 percent of the total oil flow distributed to the inner-ring raceway. Successful operation was experienced with both 50% and 75% flow patterns to 2.5 million DN. Cooling the outer ring had little effect on inner-ring temperature; however, the outer-ring temperature decreased as much as 7% at 2.5 million DN. Maximum recorded power loss was 3.1 kW (4.2 hp), and maximum cage slip was 8.7 percent. Both occurred at a shaft speed of 72000 rpm, a lubricant flow rate of 1900 cu/min (0.50 gal/min), a combined load, and no outer-ring cooling.

515,166
N85-13234/8/GAR PC **A02**/MF **A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Effect of Lubricant Extreme-Pressure Additives on Surface Fatigue Life of AISI 9310 Spur Gears.
H. W. Scibbe, D. P. Townsend, and P. R. Aron. Dec 84, 14p NAS 1.60:2408, E-2042, NASA-TP-2408

Surface fatigue tests were conducted with AISI 9310 spur gears using a formulated synthetic tetraester oil (conforming to MIL-L-23699 specifications) as the lubricant containing either sulfur or phosphorus as the EP additive. Four groups of gears were tested. One group of gears tested without an additive in the lubricant acted as the reference oil. In the other three groups either a 0.1 wt % sulfur or phosphorus additive was added to the tetraester oil to enhance gear surface fatigue life. Test conditions included a gear temperature of 334 K (160 F), a maximum Hertz stress of 1.71 GPa (248 000 psi), and a speed of 10,000 rpm. The gears tested with a 0.1 wt % phosphorus additive showed pitting fatigue life 2.6 times the life of gears tested with the reference tetraester based oil. Although fatigue lives of two groups of gears tested with the sulfur additive in the oil showed improvement over the control group gear life, the results, unlike those obtained with the phosphorus oil, were not considered to be statistically significant.

515,167
N85-13253/8/GAR PC **A03**/MF **A01**
Centre Technique des Industries Mecaniques, Senlis (France).
Surveillance des Machines (The Monitoring of Machines).
Final Report.
P. Coudray, and M. Guesdon. May 83, 26p CETIM-15-J-041
Text in French.

The automatic diagnosis of gear reductor wear is developed using a combination of vibratory analysis and lubricating oil chemical analysis. The tests were performed on 20 gear reductors run to breakdown. An accelerometer produced the vibration signal, analyzed at three frequency bands. The spectra were obtained by Fourier analysis. The metallic particles in the lubricating oil were analyzed by emission spectroscopy and ferrography. The oil composition analysis characterizes the wear well, but is not efficient to forecast fatigue breakdowns. Vibration amplitude analysis indicates breakdown risk at 95% of the life cycle, while middle frequency band analysis indicates the component threatening breakdown.

515,168
PAT-APPL-6-666 786/GAR PC **A02**/MF **A01**
Department of the Air Force, Washington, DC.
Vibration Isolated Cold Plate Assembly.
Patent Application,
R. T. Dolbeare. Filed 31 Oct 84, 12p AD-D011 444/7
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A vibration isolated cold plate assembly is described having a cold plate cover and a base interconnected together by means of a pair of elongated, rectangular-shaped elements made of elastomeric material. The elongated elements form there between a channel through which a coolant flows in communication with a plurality of cooling fins which are secured only to the undersurface of the cold plate cover. Electronic components are mounted on the upper surface of the cold plate cover and are held thereon in a vibration isolated environment while simultaneously having any excess heat dissipated therefrom. (Author)

515,169
PATENT-4 471 444 Not available NTIS
Department of Commerce, Washington, DC.
Rotating Tool Wear Monitoring Apparatus.
Patent,
K. W. Yee, and D. S. Blomquist. Filed 2 Apr 82, patented 11 Sep 84, 9p PB85-148534, PAT-APPL-6-364 944
Supersedes PB82-197708.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $1.00.

A system is provided for predicting when the failure of a rotating machine tool or part is imminent or when a tool is worn. The system includes a transducer for producing an output related to the workpiece vibrations caused by the machine tool and an analog comparator

which compares this output with a threshold signal related to the normal operation of the tool and established by a microcomputer which determines whether further signals which exceed the threshold are produced during each of a predetermined number of subsequent time intervals related to the rotational speed of the tool. If so, a 'failure' signal is produced which may be used, for example, to cause retraction of the tool.

515,170
PB85-139632/GAR PC **E06**/MF **E06**
Southampton Univ. (England). Inst. of Sound and Vibration Research.
Vibrational Power Transmission of an Idealised Gearbox.
Technical rept.,
R. C. N. Leung. Jun 84, 98p TR-124
Errata sheet inserted.

Vibrational power transmission of an idealized gearbox or electric motor was analyzed. The results revealed that a journal bearing with a high eccentricity ratio has smaller effect on the power transmission process than a journal bearing with a low eccentricity ratio. In the analyses of the point inertances, it was found that the local stiffness at the point of the application force governs the anti-resonances. The first resonance of the idealized gearbox configuration can be estimated with reasonable accuracy using the result of the point inertance of an infinite plate. The estimation process involves no complicated mathematical calculation. An experiment of the transfer inertance was performed on an aluminium disc. The results agreed remarkably well with the theoretical predictions.

515,171
PB85-149532/GAR PC **E06**/MF **E01**
Toshiba Corp., Tokyo (Japan).
Toshiba Review, Vol. 39, No. 12, 1984.
c1984, 102p
Text in Japanese. See also PB85-149540, PB85-149557, and PB85-135903.Color illustrations reproduced in black and white.

This special issue highlights Variable-Speed Motor Drive Systems and contains articles on: Recent Tendency of Power Devices for Motor Driving; Large-Capacity Thyristor-Motor Drive System; Cycloconverter and Its Application; Current-Source Inverter and Its Application; Transistorized Inverter and Examples of its Application; Digital-Controlled Inverter, VF PACK-A; Machining System for Large-Sized Parts; Invertered Air Conditioners with High-Heating Capacity. Also contains information on Patent and Licenses and reports on new equipment.

13J. Marine Engineering

515,172
AD-A148 860/0/GAR PC **A04**/MF **A01**
Army War Coll., Carlisle Barracks, PA.
USAWC (United States Army War College) Military Studies Program. Soviet Merchant Marine.
Study project,
P. N. Johnson. 16 May 84, 64p

The Soviet merchant marine's growth from 1900 to the middle of the 1950s was generally slow and uneven compared to its expansion in more recent years. In the late 1950s development of its merchant fleet was accelerated. This expansion resulted from greatly increased seaborne merchant shipments. The growth has produced a Soviet merchant marine sufficiently large and diversified to carry most of their own foreign trade cargo, to deliver military and economic aid without dependence of foreign ships, to satisfy basic domestic needs in sea transport, and to earn enough foreign currency to pay for the Soviet charter of foreign ships and supplement the Soviet need for foreign currency. Apparently, by grand design these increased merchant marine resources are actually contributing toward a more powerful Soviet strategic naval capability. In addition to the positive political and economic aspects of a large merchant marine fleet, the Soviets continue as well to enhance the military capabilities of this fleet. Ultimately, they have the apparent goal of using portions or all of their merchant marine fleet to support their naval forces in the event of a limited or global conflict. (Author).

515,173
AD-A148 887/3/GAR PC **A04**/MF **A01**
Naval Civil Engineering Lab., Port Hueneme, CA.
Model and Small-Scale Tests to Evaluate the Performance of Drag Anchors in Combination.
Rept. for Jan 81-Sep 83,
R. J. Taylor, and G. R. Walker. Oct 84, 67p Rept no. NCEL-TN-1707

Model and small-scale field tests of high efficiency anchors in tandem (piggy back) and in parallel have been performed to evaluate the feasibility of using anchors in combination to satisfy expanded Navy fleet mooring requirements. This report presents the results of model tests in sand and in a synthetic clay-like material with 1/20th-scale models of a 6,000-pound STATO anchor and results of tests in beach sand with 200-pound STATOand 350-pound DANFORTH anchors. Feasible rigging methods for using combinations of high efficiency anchors that are compatible with Navy installations and handling capability are defined. Anchors in tandem and parallel can be arranged to achieve system capacities that exceed the sum of two individually pulled anchors. The increased performance averages 20% to 30% and is directly related to potential cost savings in anchor procurements.

13K. Pumps, Filters, Pipes, Fittings, Tubing and Valves

515,174
AD-A148 939/2/GAR PC **A04**/MF **A01**
Army Engineer Waterways Experiment Station, Vicksburg, MS. Hydraulics Lab.
Fixed-Cone Valve Prototype Tests, New Melones Dam, California.
Final rept.,
T. L. Fagerburg. Aug 84, 59p Rept no. WES/TR/HL-84-7
See also Rept. no. WES/TR/HL-83-2 dated Feb 83, AD-A129 444.

The report presents the results of tests conducted subsequent to those discussed in US Army Engineer Waterways Experiment Station Technical Report HL-83-2 dated February 1983. The purpose of the tests was to obtain data at a higher pool elevation to: (a) determine the dynamic response of the 78-in.-diam fixed-cone valve and 18-ft-diam hood, (b) determine the probability of valve fatigue-type failure under prolonged operation, and (c) compare results with those of the earlier (basic) tests and model tests. Results of the data reduction include information on discharge characteristics of the fixed-cone valve, evaluations of pressure fluctuations in the valve and hood, vibration responses of the valve and hood, and strain measurements on the valve test vane. The acceleration data revealed no significant changes due to the increase in pool elevation. Mean pressure values in the valve and hood increased as a result of the increase in total head, No negative pressures were recorded. Imposed limitation of the total sleeve travel to a maximum of 28.1 in. prevented the occurrence of a flow control shift.

515,175
AD-A148 943/4/GAR PC **A02**/MF **A01**
Cold Regions Research and Engineering Lab., Hanover, NH.
Freezing and Blocking of Water Pipes.
Technical digest,
K. L. Carey. May 82, 14p Rept no. CRREL-TD-82-1

The topic addressed in this article is the freezing and blockage of water pipes that are full, with the water either flowing or still. It has long been assumed that when the water in a pipe freezes the ice begins to form on the inside surface of the pipe and grows uniformly inward (annular growth), until finally the pipe is completely blocked. Under this hypothesis, the freezing process is fairly slow and quite predictable. The only difference between the freezing of flowing water and static water is a difference in freezing rate due to the addition of heat via the water flow. Recent studies of pipe freezing, however, have shown that the freezing process is much more complicated than this. Furthermore, the process differs substantially for still water and flowing water. Water flow can become blocked much quicker than was supposed under the earlier hypothesis, and the actual freezing process appears to be less predictable in terms of time and heat loss. These recently observed phenomena are the primary focus of this article.

515,176
DE85000360/GAR PC **A03**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Prototype Firing Range Air Cleaning System.
J. A. Glissmeyer, J. Mishima, and J. A. Bamberger.
Jul 84, 27p PNL-SA-12043, CONF-840806-12
Contract AC06-76RL01830
18. DOE nuclear airborne waste management and air cleaning conference, Baltimore, MD, USA, 13 Aug 1984.

PNL's study proceeded by examining the characteristics of the aerosol challenge to the filtration system and the operating experience at similar firing ranges. Candidate filtration systems were proposed; including baghouses, cartridge houses, electrostatic precipitators, cleanable high efficiency filters, rolling filters and cyclones--each followed by one or more of the existing filter banks. Methodology was developed to estimate the operating costs of the candidate systems. Costs addressed included the frequency (based on fractional efficiency and loading data) and cost of media replacement, capital investment, maintenance, waste disposal and electrical power consumption. The recommended system will be installed during calendar year 1984. (ERA citation 10:003106)

515,177
NUREG/CR-3949-V1/GAR PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Eddy-Current Inspection for Steam Generator Tubing Program Semiannual Progress Report for Period Ending June 30, 1984.
Rept. for 1 Jan-30 Jun 84,
C. V. Dodd, W. E. Deeds, J. H. Smith, and R. W. McClung. Jul 84, 13p ORNL/TM-9339/V1
Contract DE-AC05-84OR21400
See also NUREG/CR-3200-V4.

Eddy-current inspection is the most suitable method for rapid boreside evaluation of steam generator tubing. However, small flaws can be masked by the effects of harmless variables, such as tube supports. For this reason instrumentation has been developed capable of measuring both the amplitude and phase of the eddy-current signal at several different frequencies and computer equipment capable of processing the data quickly and reliably. The new IBM System 9000 computer has been adapted to take and process the larger amounts of data required by additional variables, such as copper coating and intergranular attack.

515,178
N85-13199/3/GAR PC **A03**/MF **A01**
Imperial Coll. of Science and Technology, London (England).
Organ-Pipe Oscillation.
W. Jzy. Feb 84, 29p PDR/CFDU-IC/14
Sponsored by UK Health and Safety Executive.

The ability of the PHOENICS program to calculate an organ pipe oscillation was tested. Predictions for velocity amplitude = 10 m/sec, frequency = 100/sec, and duct length = 1.0 m are presented. Quantitative PHOENICS results agree with those of an analytical solution.

515,179
N85-13201/7/GAR PC **A08**/MF **A01**
Centre Technique des Industries Mecaniques, Senlis (France).
Bruit Robinet/Fluctuations de Pression. Etude du Comportement Acoustique des Equipments Hydrauliques du Batiment en Fonction de la Temperature (Tap Noise-Pressure Fluctuations. Study of the Acoustic Behavior of Hydraulic Equipment in Buildings as a Function of the Temperature).
Final Report.
G. Bernard, M. Letiche, and C. Kegozzi. Mar 83, 163p CETIM-11-H-337
Text in French.

Tap noise was studied using a hydrophone. A test bench provided with a noise spectra analyzer was employed. Studies with hot water showed the evolution of the noise level with the water temperature. The normalized noise measurement method is described, and is proposed as a standard for France. The curves showing the effects of temperature for different kind of valves are presented.

515,180
PB85-143170/GAR PC **E03**/MF **E03**
Central Electricity Generating Board, Southampton (England). Technology Planning and Research Div.
Air Abrasive Equipment for the Measurement of Residual Stresses in the Bores of Pipes and Tubes,
R. Fidler. c1984, 21p TPRD/M/1436/N84

Two pieces of equipment that have been developed for making residual stress measurements in the bores of main-steam pipes and boiler tubes are described. The designs are based on the center hole residual stress measurement technique and employ air-abrasive cutting, thus making them equally applicable to ferritic and austenitic steels. Although undertaken for specific purposes, the designs have a general application to situations where access is restricted.

13L. Safety Engineering

515,181
PB84-916408/GAR PC **A06**/MF **A01**
National Transportation Safety Board, Washington, DC. Bureau of Accident Investigation.
Marine Accident Report - Capsizing and Sinking of the United States Drillship GLOMAR JAVA SEA in the South China Sea, 65 Nautical Miles South-Southwest of Hainan Island, People's Republic of China, October 25, 1983.
14 Nov 84, 104p NTSB/MAR-84/08
Paper copy also available on subscription, North American Continent price $60.00/year; all others write for quote.

About 2355 on October 25, 1983, the 400-foot-long United States drillship GLOMAR JAVA SEA capsized and sank during Typhoon LEX in the South China Sea about 65 nautical miles south-southwest of Hainan Island, People's Republic of China. Of the 81 persons who were aboard, 35 bodies have been located, and the remaining 46 persons are missing and presumed dead. The GLOMAR JAVA SEA currently is resting on the bottom of the sea in an inverted position in about 315 feet of water; its estimated value was $35 million.

515,182
PB84-916505/GAR PC **A03**/MF **A01**
National Transportation Safety Board, Washington, DC. Bureau of Accident Investigation.
Pipeline Accident Report - Boston Gas Company, Natural Gas Overpressure, Explosion and Fires, East Boston, Massachusetts, September 23, 1983.
16 Oct 84, 26p NTSB/PAR-84/05
Paper copy also available on subscription, North American Continent price $45.00/year; all others write for quote.

About 2:53 a.m., e.d.t., on September 23, 1983, an alarm indicating that the pressure in a low pressure gas system had risen substantially in the East Boston, Massachusetts, area was received by the dispatcher at a Boston Gas Company control center. By 3 a.m., many East Boston residents were awakened to the sound and smell of blowing gas and to the sight of high gas pilot lights and high gas appliance flames in their homes. The Boston Fire Department responded immediately and began alerting and evacuating residents, turning off gas at customer meters, and fighting fires. A 1-square-mile section of East Boston was affected; one restaurant was destroyed by a natural gas explosion, two residences were destroyed by gas-fed fires, and other small fires occurred as a result of the gas overpressure. No fatalities or injuries resulted from the accident.

515,183
PB84-917008/GAR PC **A03**/MF **A01**
National Transportation Safety Board, Washington, DC. Bureau of Accident Investigation.
Railroad/Highway Accident Report - Collision of Amtrak Passenger Train No. 301 on Illinois Central Gulf Railroad with Marquette Motor Service Terminals, Inc. Delivery Truck, Wilmington, Illinois, July 28, 1983.
16 Oct 84, 30p NTSB/RHR-84/02
Paper copy also available on subscription, North American Continent price $55.00/year; all others write for quote.

About 9:48 a.m., c.d.t., on July 28, 1983, Amtrak train No. 301, operating on the Illinois Central Gulf Railroad, collided with a Marquette Motor Service Terminals, Inc., delivery truck at the New River Road railroad/highway grade crossing about 1 mile north of Wilmington, Illinois. The locomotive unit and all three cars of the train were derailed, and the truck and its lading were destroyed. Two train crewmembers, the truckdriver, and 18 train passengers were injured. Total damage was estimated to be $584,000. The National Transportation Safety Board determines that the probable cause of the accident was the failure of the truckdriver for undetermined reasons to perceive the crossbuck warning signs, the flashing light signals, the approaching train, or the whistle of the approaching train and to stop his vehicle short of the tracks at the railroad/highway grade crossing.

515,184
PB85-132207/GAR CP **T03**
Federal Emergency Management Agency, Washington, DC.
National Fire Incident Reporting System (NFIRS) Data Base (1983 Equipment/Casualty File).
Data file,
B. Johnson. 1983, mag tape FEMA/DF-85/001
See also PB84-103373, PB83-103028, PB83-103036, PB83-103135, PB83-103127, PB83-103101 and PB83-102954.
Source tape is in the EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products if you have questions.

The U.S. Fire Administration established the National Fire Incident Reporting System for the collection of fire incident and fire casualty data on a nationwide basis. NFIRS is the center of the Office of Fire Data and Analysis' program which has as one of its primary goals assisting state and local governments and other critical groups in the development of their own fire data systems, and in the use and interpretation of their data. NFIRS contributes to the second major goal of the Office of Fire Data and Analysis, as well; this is to determine the magnitude and characteristics of the U.S. fire problem in sufficient detail and accuracy to guide fire protection decisions of various levels of government and the private sector, and help identify solutions to the problems identified.

515,185
PB85-132215/GAR CP **T08**
Federal Emergency Management Agency, Washington, DC.
National Fire Incident Reporting System (NFIRS) Data Base (1983 Master File).
Data file,
B. Johnson. 1983, mag tape FEMA/DF-85/003
See also PB84-103423, PB83-103044, PB83-103051, PB83-103069, PB83-103077, PB83-103143, PB83-103085 and PB83-103093.
Source tape is in the EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products if you have questions.

The U.S. Fire Administration established the National Fire Incident Reporting System for the collection of fire incident and fire casualty data on a nationwide basis. NFIRS is the center of the Office of Fire Data and Analysis' program which has as one of its primary goals assisting state and local governments and other critical groups in the development of their own fire data systems, and in the use and interpretation of their data. NFIRS contributes to the second major goal of the Office of Fire Data and Analysis, as well; this is to determine the magnitude and characteristics of the U.S. fire problem in sufficient detail and accuracy to guide fire protection decisions of various levels of government and the private sector, and help identify solutions to the problems identified.

515,186
PB85-132231/GAR CP **T05**
Federal Emergency Management Agency, Washington, DC.
National Fire Incident Reporting Systems (NFIRS) Data Base (1983 Incident File).
Data file,
B. Johnson. 1983, mag tape FEMA/DF-85/002
See also PB84-103365, PB83-103010, PB83-102996, PB83-102988, PB83-102962, PB83-102970, PB83-103119 and PB83-103002.
Source tape is in the EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products if you have questions.

The U.S. Fire Administration established the National Fire Incident Reporting System for the collection of fire incident and fire casualty data on a nationwide basis. NFIRS is the center of the Office of Fire Data and Analysis' program which has as one of its primary goals assisting state and local governments and other critical groups in the development of their own fire data systems, and in the use and interpretation of their data. NFIRS contributes to the second major goal of the Office of Fire Data and Analysis, as well; this is to determine the magnitude and characteristics of the U.S. fire problem in sufficient detail and accuracy to guide fire protection decisions of various levels of government and the private sector, and help identify solutions to the problems identified.

515,187
PB85-142743/GAR PC **A03**/MF **A01**
Minerals Management Service, Metairie, LA. Gulf of Mexico OCS Regional Office.
Risk Analysis of Crane Accidents, Gulf of Mexico OCS Region,
W. Danos, and L. E. Bennett. 1983, 32p OCS/MMS-84/0056

This is a synopsis containing general information. The purpose of this analysis is to evaluate risks associated with the operation of cranes and related equipment on oil and gas drilling and production facilities in the Gulf of Mexico OCS. The data presented was obtained from the OCS Gulf of Mexico Accident Events File and the accident files maintained by the Standards and Orders Unit of Rules and Production. The accidents extracted from the referenced files occurred between January 1, 1981 and June 30, 1983.

515,188
PB85-916300/GAR Subscription
National Transportation Safety Board, Washington, DC. Bureau of Accident Investigation.
Railroad Accident Reports.
Irregular repts.
1985, open series
Supersedes PB84-916300.
Paper copy available on subscription, North American Continent price $55.00/year; all others write for quote. Single copies also available in paper or microfiche.

The subscription offers publications presenting railroad accident reports. The publications are issued irregularly.

515,189
PB85-917000/GAR Subscription
National Transportation Safety Board, Washington, DC. Bureau of Accident Investigation.
Transportation Special Reports.
Irregular repts.
1985, open series
Supersedes PB84-917000.
Paper copy available on subscription, North American Continent price $50.00/year; all others write for quote. Single copies also available in paper or microfiche.

This subscription offers publications presenting special investigation reports. The publications are issued irregularly.

13M. Structural Engineering

515,190
AD-A148 895/6/GAR PC **A18**/MF **A01**
Ammann and Whitney, New York.

Structures to Resist the Effects of Accidental Explosions. Volume 3. Principles of Dynamic Analysis.
Final rept.,
M. Dede, F. Sock, S. Lipvin-Schramm, and N. Dobbs.
Jun 84, 413p ARLCD-SP-84001-VOL-3, SBI-AD-E401 178
Contract DAAK10-82-C-0112

This report, in six volumes, details design procedures for structures which are subjected to the effects of accidental explosions. The procedures cover the determination of the blast environment (blast and fragments) and then structural design. This volume, Principles of Dynamic Analysis, in particular, contains the procedures for analyzing structural elements subject to blast overpressures. It discusses the basic principles of dynamics as well as procedures for calculating the various components used to perform the analyses. Also presented are resistance-deflection functions for various elements including both one- and two-way panels as well as beam elements. These functions include the elastic, elasto-plastic, and plastic ranges of response. In addition, a discussion of dynamic equivalent systems (single- and multi-degree-of-freedom systems) is presented. A step-by-step numerical integration of an element's motion under dynamic loads using the acceleration-impulse-extrapolation method or the average acceleration method and design charts for simplified loads is illustrated. It also includes methods for analyzing elements subjected to impulse type loadings, that is, loadings whose durations are short in comparison to the time to reach maximum response of the elements. Example problems and solutions using these procedures are also included.

515,191
N85-13552/3/GAR PC **A02/MF A01**
College of William and Mary, Williamsburg, VA.
Response Measurements for Two Building Structures Excited by Noise from a Large Hortzontal Axis Wind Turbine Generator.
H. H. Hubbard, and K. P. Shepherd. Nov 84, 25p
NAS 1.26:172482, NASA-CR-172482
Contracts NAS1-16978, NAG1-166

Window and wall acceleration measurements and interior noise measurements ere made for two different building structures during excitation by noise from the WTS-4 horizontal axis wind turbine generator operating in a normal power generation mode. With turbine noise input pulses resulted in acceleration pulses for the wall and window elements of the two tests buildings. Response spectra suggest that natural vibration modes of the structures are excited. Responses of a house trailer were substantially greater than those for a building of sturdier construction. Peak acceleration values correlate well with similar data for houses excited by flyover noise from commercial and military airplanes and helicopters, and sonic booms from supersonic aircraft. Interior noise spectra have peaks at frequencies corresponding to structural vibration modes and room standing waves; and the levels for particular frequencies and locations can be higher than the outside levels.

515,192
PB85-138683/GAR PC **A06/MF A01**
California State Dept. of Transportation, Sacramento. Div. of Structures.
Long Span Bridge Deflections.
Final rept.,
B. H. Nelsen, and P. J. Jurach. Dec 83, 163p R-624122, FHWA/CA/SD-82/01
See also SHR-0011683.

This report discusses an investigation of the immediate and long term deflection of simple span and continuous prestressed concrete bridges. The study examines the design assumptions and construction methods used to plan and build the superstructure with respect to its deflections. Factors affecting bridge deflection such as concrete strength, modulus of elasticity, aggregate shrinkage, structure shortening, length of time the structure is on falsework, skew, and end condition of the abutments are also analyzed. Falsework load distribution is studied.

515,193
PB85-142677/GAR PC **E08/MF E08**
Property Services Agency Library Service, Croydon (England).
Construction References No. 1, 1984.
1984, 131p R-1/84
See also PB84-238138.

Covering the period January to June 1984. Construction references surveys current literature on the construction industry. It is issued twice a year and contains references to books, pamphlets and selected periodical articles directly concerned with construction and with related subjects such as administration, law, management and building industry. Summaries of most entries are provided.

515,194
PB85-144707/GAR PC **E08/MF E08**
Property Services Agency Library Service, Croydon (England).
Construction References No. 1, 1983.
1983, 139p R-1/83
See also PB84-238138.

Covering the period January to June 1983. Construction references surveys current literature on the construction industry. It is issued twice a year and contains references to books, pamphlets and selected periodical articles directly concerned with construction and with related subjects such as administration, law, management and building industry. Summaries of most entries are provided.

14. METHODS AND EQUIPMENT

14A. Cost Effectiveness

515,195
DE84016252/GAR PC **A02/MF A01**
Bendix Corp., Kansas City, MO.
Contingency Analysis for Construction Estimate.
S. E. Mueller. Aug 84, 13p BDX-613-3108, CONF-8409126-1, CONF--841186--1
Contract AC04-76DP00613
American Association of Cost Engineers Kansas City Section meeting, Kansas City, NE, USA, 20 Sep 1984. Portions are illegible in microfiche products.

Cost Guide, Vol. 6, Cost Estimating Methods and Techniques, is implemented by DOE 5700.2B and AL 5700.2B (Draft), which define minimum requirements for cost estimating of construction projects submitted for DOE approval. One of the requirements states, Each project shall have a contingency analysis performed. Cost Engineering has developed the methods of this procedure to comply with these Orders. (ERA citation 10:002428)

14B. Laboratories, Test Facilities, and Test Equipment

515,196
AD-A148 900/4/GAR PC **A02/MF A01**
Army Armament Research and Development Center, Dover, NJ. Product Assurance Directorate.
Ultrasonic Inspection of Alloyed Tungsten Bars.
Final technical rept.,
H. Hartmann. Nov 84, 20p ARPAD-TR-84007, SBI-AD-E401 258

Alloyed tungsten bars made from powdered metals that are compressed, sintered, and swagged can be ultrasonically inspected. Both longitudinal and shear waves were used, the latter being more sensitive. A frequency of 2.25 MHz proved best. One crack was found. The crack was equated to a standard.

515,197
AD-A148 920/2/GAR PC **A02/MF A01**
National Bureau of Standards, Washington, DC.
Surface-Wave Displacement: Absolute Measurements Using a Capacitive Transducer.
Technical rept.,
F. R. Breckenridge, and M. Greenspan. Apr 81, 11p Rept no. TR-81-1
Contracts N00014-80-F-0016, N00014-81-F-0009
Pub. in Jnl. of the Acoustical Society of America, v69 n4 p1177-1185 Apr 81.

No abstract available.

515,198
AD-A149 003/8/GAR PC **A02/MF A01**
Army Test and Evaluation Command, Aberdeen Proving Ground, MD.
US Army Test and Evaluation Command Test Operations Procedure 'Durability'.
Final rept.
19 Dec 84, 21p Rept no. TOP-1-2-502
Supersedes report dated 14 Sep 72, AD-759 770.

This TOP provides guidelines for planning and conducting durability tests. It applies to all items for which durability criteria exist or can be developed, and for which a durability test is required by test directive.

515,199
AD-A149 059/8/GAR PC **A04/MF A01**
Foreign Technology Div., Wright-Patterson AFB, OH.
Chinese Journal of Infrared Research (Selected Articles),
H. Gong, G. Zhao, and Q. Wang. 9 Feb 83, 57p Rept no. FTD-ID(RS)T-1655-82
Edited trans. of Hongwai Janjiu (China) v1 n2 p93-106, 145-148 1982.

No abstract available.

515,200
AD-A149 080/4/GAR PC **A02/MF A01**
IBM Research Lab., San Jose, CA.
Pulsed Photothermal Radiometry for Remote Sensing of Spectroscopic and Physical Properties of Thin Film.
Technical rept.,
A. C. Tam. 18 Dec 84, 12p Rept no. TR-14
Contract N00014-83-C-0170

Photothermal Radiometry (PTR) is a sensitive technique for noncontact spectroscopy and inspection; a modulated beam of photons (or other particles) is used to produce temperature transients, and the corresponding transients in the infrared thermal radiation emitted form the sample are analyzed. This paper describes the recent experimental and theoretical developments of pulsed PTR (PPTR) with back-scattering detection. PPTR is useful for many types of noncontact measurements, including absolute absorption spectroscopy, excitation spectroscopy, and the monitoring of thickness layered structure, thermal contacts, and associated properties. Further more, these measurements can be made on difficult samples like opaque materials, powders, aerosols, gels, skin in-vivo, and so on.

515,201
DE85000257/GAR PC **A03/MF A01**
Sandia National Labs., Livermore, CA.
Solid Particle Receiver Experiments: Velocity Measurements.
J. M. Hruby, and V. P. Burolla. Oct 84, 42p SAND-84-8238
Contract AC04-76DR00789

Laser Doppler velocimetry and other photometric techniques are evaluated for measuring the average particle velocity in an ensemble of free-falling particles. The ability to obtain measurements in the presence of a radiant flux as high as 0.6 MW/m exp 2 was part of the evaluation. Optically dissimilar particles with diameters ranging from 0.1 mm to 1 mm were used in the study. Experimental results indicate that ensembles of particles do not behave as single isolated particles. The particle motion is dependent on particle volume fraction, and is quite unstable for falls greater than one meter. (ERA citation 10:002167)

515,202
DE85000403/GAR PC **A02/MF A01**

Oak Ridge Gaseous Diffusion Plant, TN.
Applications of Pulsed-Laser Techniques and Thermographic Phosphors to Dynamic Thermometry of Rotating Surfaces.
M. R. Cates, S. W. Allison, B. R. Marshall, L. A. Franks, and T. J. Davies. 1984, 8p K/TS-11-504, CONF-8411100-2
Contract AC05-84OT21400
International conference on applied lasers and electro optics, Boston, MA, USA, 12 Nov 1984.
Portions are illegible in microfiche products.

Stimulating fluorescence by synchronous application of pulsed uv laser light is used to measure surface temperatures of rotating objects. The temperature dependence of the lifetime of selected emission lines from a phosphor bonded to the surface provides temperature resolution, in the room temperature range, of about 0.3 degrees C. The experimental technique includes fiber optics transfer of stimulating and signal light, timing circuitry, photomultiplier electronics, and waveform processing. (ERA citation 10:003213)

515,203
DE85001074/GAR PC **A02**/MF **A01**
Lawrence Livermore National Lab., CA.
Nondestructive Method for Detecting Machine Damage in Beryllium.
R. D. Weglein, J. E. Hanafee, and S. E. Benson. 6 Jul 84, 11p UCRL-90743, CONF-840738-8
Contract W-7405-ENG-48
Progress in quantitative NDE, San Diego, CA, USA, 8 Jul 1984.

Machining damage (MD) was detected and characterized in the acoustic microscope via the acoustic material signature (AMS) technique. This technique permits the easy measurement of surface acoustic wave (SAW) dispersion that is produced by machining damage in beryllium. Approximately 3% SAW velocity reduction as compared to the undamaged substrate was observed at 35 MHz. The damaged layer is approximately 25 mu m deep as estimated from metallurgically prepared cross-sectional views. Nondestructive machining-damage assessment by AMS is discussed with extension to depth profiling over a wide frequency range. (ERA citation 10:003040)

515,204
DE85001893/GAR PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
Materials Science with Synchrotron Radiation: The Case for a Superprobe.
C. J. Sparks. 1984, 42p CONF-8403148-2
Contract AC05-84OR21400
Major Materials Facilities Committee of the National Research Council seminar, Washington, DC, USA, 17 Mar 1984.
Portions are illegible in microfiche products.

The mechanical strength, ductility, diffusion, corrosion, and electrical properties of materials are profoundly modified by defects (both structural and impurity) about which we need microcharacterization. An x-ray microprobe is the next leap forward in microcharacterization. Undulators on a 6 GeV storage ring will provide for an x-ray microprobe of extraordinary sensitivity. (ERA citation 10:003031)

515,205
DE85002237/GAR PC **A03**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.
Infrared-Thermal Wave Scanner for NDE of Naval Thermal Spray Coatings.
D. R. Green, C. R. Wandling, and F. B. Gatto. 27 Feb 84, 29p HEDL-SA-2995-FP, CONF-8404135-7
Contract AC06-76FF02170
International conference on metallurgical coatings, San Diego, CA, USA, 9 Apr 1984.
Portions are illegible in microfiche products.

An engineering prototype scanning system has been completed and evaluated in shop tests. This paper describes the system and shows examples of bond defects that have been detected. The system uses advanced emissivity independent infrared scanning and thermal wave techniques to detect nonbonds and differentiate them from variations in coating density and thickness. A computer is used to control the scanning process, analyze the data and produce pseudo three-dimensional scan maps that can easily be interpreted by the operator. These maps show the thermal wave response (Z axis) as a function of position (X and Y axis) on the test object's surface. Operator interpretation of the maps as well as processing of the information by the system's micro-computer are simple. A heat pulse injected into the test objects surface generates a thermal wave that propagates inward at a rate that depends upon the thermal impedances it encounters. These internal impedances are caused by coating density differences, thickness differences and nonbonds. They influence the surface thermal impedance of the test object. Measurement of the surface thermal impedance can be accomplished by forming the ratio of the temperature response to heat flow for sinusoidal waves, or for transforms of transient waves, at the test objects surface. The surface thermal impedance is a true complex quantity, having both phase and amplitude. It is also frequency dependent, and this makes it possible to distinguish between impedance differences resulting from coating density differences, thickness differences and nonbonds. (ERA citation 10:003038)

515,206
DE85002527/GAR PC **A02**/MF **A01**
Monsanto Research Corp., Miamisburg, OH. Mound.
Automated Servo Controlled Calorimetry.
J. R. Wetzel. 1984, 4p MLM-3198(OP), CONF-841007-22
Contract AC04-76DP00053
Nuclear science symposium, Orlando, FL, USA, 31 Oct 1984.
Portions are illegible in microfiche products.

A method of operating a calorimeter is called the servo controlled method. An internal heater is driven by a controlled voltage source to produce a constant internal temperature. The heater power is controlled by a digital computer program that uses as one of its inputs the bridge potential. The heater power can be calculated by multiplying the heater current by the heater voltage. A bridge potential can then be determined that will produce the desired internal power level. When a sample is placed in the calorimeter the servo system reduces the heater power to maintain the set point bridge potential. There will be four calorimeters in the system - two for large sizes and two for small sizes. They will be servo controlled using a DEC Micro-11 computer with a IEEE-488 interface buss. (ERA citation 10:003217)

515,207
DE85002530/GAR PC **A02**/MF **A01**
Argonne National Lab., IL.
Linear, Position-Sensitive X-Ray Detector Used for Real-Time Calculations of Small-Angle Scattering Parameters with Submillisecond Resolution.
C. S. Borso. 1984, 4p CONF-8410112-2
Contract W-31-109-ENG-38
Symposium on polymer research at synchrotron radiation sources, Upton, NY, USA, 29 Oct 1984.

The advent of high-intensity X-ray synchrotron sources has made possible the measurement of fluctuations in small-angle scattering parameters from typical specimens on a submillisecond time scale in real-time. The fundamental design of any fast detector system optimized for such measurements will incorporate some type of solid state detector array capable of rapid encoding algorithms. A prototype with a self-scanning photodiode array has been designed and tested at beamline 1 to 4 at the Stanford Synchrotron Radiation Laboratory (SSRL), and the results indicate that the device will operate at speeds yielding submillisecond temporal resolution in real-time. (ERA citation 10:003168)

515,208
DE85002593/GAR PC **A02**
Oak Ridge National Lab., TN.
Technique for Reduction of Coherence Function Bias Error.
W. T. King. 1984, 3p CONF-841007-24
Contract AC05-84OR21400
Nuclear science symposium, Orlando, FL, USA, 31 Oct 1984.
Paper copy only, copy does not permit microfiche production.

The bias error in the coherence function is found to arise from the calculation of the square magnitude of the cross-power spectral density when the real and imaginary components are not converged. Therefore, the bias error of the coherence function can be decreased significantly without averaging more data blocks if the variance of the real and imaginary components are reduced by fitting the spectra of these separate components to an appropriate model. (ERA citation 10:005205)

515,209
DE85002661/GAR PC **A05**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Capabilities of Laser Diagnostics for Combustion and Flowfields.
R. A. Hutchinson, and H. J. Bomelburg. Nov 84, 90p PNL-5280
Contract AC06-76RL01830
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This report outlines the capabilities and introduces some of the complications of several laser diagnostic techniques that utilize a variety of optical phenomena. Originally developed for aeronautics and analytical chemistry, and more recently for combustion work, these techniques are potentially applicable to a wide variety of in-situ measurements. The goal of this report is to provide a nonexpert, whether student or researcher, with basic information about the better-established diagnostics. This introduction may lead, after further study, to application of diagnostic techniques to new and important problem areas, particularly those involved in energy conversion. In the report, considerable emphasis is placed on general concerns in choosing and using a diagnostic and on outlining the limitations of specific diagnostics. These factors, and the decisions and compromises they force, are critical elements in the selection of what to measure and the best tool with which to measure it. They are not generally reported in broad terms in the literature, however. The simple discussion here provides a preliminary, user-oriented view of lasers, data acquisition and reduction requirements, generic sources of error, and the difficulties of making good measurements, as well as the required conditions and difficulties of using particular tools. (ERA citation 10:003219)

515,210
DE85002686/GAR PC **A02**
Stanford Linear Accelerator Center, CA.
Versatile CAMAC Power Supply Controller-Monitor with Built-in Ramping and Ripple Monitor.
H. Kang, and D. Horelick. Oct 84, 3p SLAC-PUB-3464, CONF-841007-23
Contract AC03-76SF00515
Nuclear science symposium, Orlando, FL, USA, 31 Oct 1984.
Paper copy only, copy does not permit microfiche production. Original copy available until stock is exhausted.

An integrated power supply controller-monitor has been designed and is in use to control large power supplies for SLC dc magnets. This single-width CAMAC module contains a 14-bit DAC, a 14-bit ADC, and several channels of optically coupled digital status and control signals. Additional features include built-in selectable ramping rates, self-test capabilities, and a ripple monitor circuit to measure ac ripple in the power supply current. (ERA citation 10:005267)

515,211
DE85002732/GAR PC **A02**/MF **A01**
Argonne National Lab., IL.
Calculation of Si(Li) X-Ray Detector Efficiencies.
N. J. Zaluzec, and R. J. Holton. Oct 84, 21p CONF-840767-10
Contract W-31-109-ENG-38
Microbeam Analysis Society analytical electron microscopy meeting, Bethlehem, PA, USA, 19 Jul 1984.

With the advent of more accurate cross-section calculations and the availability of ultra-thin and windowless Si(Li) x-ray detector systems it becomes important to have a reliable set of parameterizations for the calculation of detector efficiency functions. The recent data on light element mass absorption coefficients has been interrogated and a new parameterization for these coefficients has been established and is presented herein. Using these equations a simple table of detector efficiency factors is given which can be used to calculate the relative detection efficiency of any x-ray line in the energy range of 0.2 to 40 keV. The table is valid for Windowless, Ultra-thin and Beryllium window detectors as they are commercially configured today, and allows the analyst to specify the various window thicknesses as desired. (ERA citation 10:002822)

515,212
DE85002734/GAR PC **A02**/MF **A01**
Argonne National Lab., IL.

Comparison of XEDS and EELS Using Conventional Beryllium Window and Windowless Detectors.
N. J. Zaluzec, R. McConville, and A. Sandborg. Oct 84, 23p CONF-840767-9
Contract W-31-109-ENG-38
Microbeam Analysis Society analytical electron microscopy meeting, Bethlehem, PA, USA, 19 Jul 1984.

An experimental study of simultaneous XEDS and EELS measurements using both conventional beryllium window and windowless Si(Li) detector systems together with a magnetic sector electron loss spectrometer was conducted on a series of metal alloys, oxides and ceramic compounds covering the elemental range of Li through Ga, with the exception of the gases Neon and Argon, as well as a few typical steel alloys. The advantages and disadvantages of the different systems XEDS versus EELS are outlined relative to the materials problems to which they can be applied. (ERA citation 10:002821)

515,213
N85-12873/4/GAR PC **A03/MF A01**
Office National d'Etudes et de Recherches Aerospatiales, Paris (France).
Adaptation de Parois a Mach 1.2 (Wall Adaptation at Mach 1.2).
Y. Lesant. Feb 84, 41p ONERA-RTS-26/3075-AY-402
Text in French.

To minimize the wall effect in low supersonic wind tunnel tests, in the presence of strong three dimensional shock waves, a self adaptable wall system is proposed. A method to analyze the wall effects in two dimensional flow which also gives a minimum effect wall shape is described. The method is extendable to three dimensional flow.

515,214
N85-12874/2/GAR PC **A05/MF A01**
Eidgenoessisches Flugzeugwerk, Emmen (Switzerland).
Singularitaeten-Modell Zur Analyse der Wandinterferenz in Geschlossenen Windkanalen Nach der Wanddrucksignatur-Methode (Blockierung und Auftrieb) (Singularity Model for the Analysis of Wall Interference in Closed Wind Tunnels According to the Wall Pressure Signature Method (Blockage and Lift)).
B. Mueller. 2 Sep 82, 91p FW-FO-1612
Text in German.

Correction methods for wall influence in large wind tunnels are considered. Tunnel blockage up to any desired angle of attack was determined by mathematically modeled wall pressure signatures. A qualitative definition of blockage and lift correction is obtained by a swell/drop and vortex modeling for typical aircraft models.

515,215
N85-12875/9/GAR PC **A04/MF A01**
Eidgenoessisches Flugzeugwerk, Emmen (Switzerland).
Wandeinfluss-Korrekturen in Windkanaelen: Blockierungskorrektur Nach der Wandrucksignatur-Methode (Wall Influence Corrections in Wind Tunnels: Blockage Correction According to the Wall Pressure Signature Method).
B. Mueller. 14 Sep 83, 60p FW-FO-1613
Text in German.

Blockage correction methods for large models or high angles of attack in closed wind tunnels are discussed. The wall pressure signature method based on a FORTRAN program was used. A correction calculation without computing of problem parameters is outlined.

515,216
N85-12876/7/GAR PC **A03/MF A01**
Eidgenoessisches Flugzeugwerk, Emmen (Switzerland).
Parametrische Bestimmung der Blockierungsinterferenzen fuer Drei-Dimensionale Modelle im Transonic-Kanal des Eidgenoessisches Flugzwerk, Emmen (Parametric Determination of Blockage Interference of 3-Dimensional Models in the Emmen Federal Aircraft Works Transonic Tunnel (Switzerland)).
G. Capitaine. 9 Dec 82, 36p FW-FO-1636
Text in German.

Blockage correction for three dimensional, compressible flow in a rectangular measuring section is treated. Upper and lower walls were slotted, side walls were closed. Results show that the weakest blockage appears when slot and porosity parameters are situated near to 1.

515,217
N85-12877/5/GAR PC **A07/MF A01**
Eidgenoessisches Flugzeugwerk, Emmen (Switzerland).
Grenzschichtuntersuchungen im Transonic-Kanal des Eidgenoessisches Flugzwerke, Emmen (Investigations of Boundary Layers in the Emmen Federal Aircraft Works Transonic Tunnel, Switzerland).
N. Cantuniar. 11 Mar 83, 136p FW-FO-1641
Text in German.

Boundary layer generation along transonic wind tunnel walls was investigated. Initial and boundary conditions were determined by a computer program. Results make it possible to determine the porosity factors of slotted tunnel walls.

515,218
N85-12878/3/GAR PC **A07/MF A01**
Eidgenoessisches Flugzeugwerk, Emmen (Switzerland).
Vergleichende Stroemungsrechnung an Transsonischen Kegel/Zylinder-Eidhmodellen im Zusammenhang MIT Dem Wandinterferenzproblem (Comparative Flow Calculation on Transonic Cone/Cylinder Standard Models in Connection with the Wall Interference Problem).
M. Boffo, and R. Pozzorini. 5 Dec 83, 133p FW-FO-1689
Text in German.

A computer program (RAXBOD) was used for the calculation of frictionless flow over slim bodies with sharp pointed and discontinuous profiles. For cone half-angles of 7.5 to 13.75 deg arc good accordance with measured results is obtained, while for half-angles of 20 deg arc and 30 deg only partly satisfying results are found. The reasons for this are not clear.

515,219
N85-12879/1/GAR PC **A03/MF A01**
Aeronautical Research Inst. of Sweden, Stockholm.
Local Slot Boundary Condition for Transonic Flow Calculations in Slotted-Wall Test Sections of Wind Tunnels.
N. Agrell, Y. C. J. Sedin, and N. Zhang. Sep 84, 30p FFA-TN-1984-34
Contract FMV-FLYGFL-82260-83-053-25-001

A local slot boundary condition is outlined and numerical results where the wall interference is calculated using a small perturbation equation in a rectangular test section with 16 equal slots are shown. The slots are locally substituted by wall strips located symetrically around each slot when calculating the test section flows. The flow through the slots are treated separately giving Dirichlet conditions along the strips in terms of the slot fluxes. Between the strips on the wall, Neumann conditions are applied. The test section flow is interactively solved with an inviscid slot flow model. Results for a delta wing at different Mach numbers and angles of attack are given. The numerical procedure is convergent, and encouraging results are obtained in terms of wall pressures and model pressures as well as integrated forces.

515,220
N85-12903/9/GAR PC **A09/MF A01**
Kansas Univ./Center for Research, Inc., Lawrence.
Preliminary Checkout, Evaluation and Calibration of a 3-Component Force Measurement System for Calibrating Propulsion Simulators for Wind Tunnel Models.
Final Report.
W. A. Scott. Sep 84, 180p NAS 1.26:174113, KU-FRL-510-1, NASA-CR-174113
Contract NCC2-100

The propulsion simulator calibration laboratory (PSCL) in which calibrations can be performed to determine the gross thrust and airflow of propulsion simulators installed in wind tunnel models is described. The preliminary checkout, evaluation and calibration of the PSCL's 3 component force measurement system is reported. Methods and equipment were developed for the alignment and calibration of the force measurement system. The initial alignment of the system demonstrated the need for more efficient means of aligning system's components. The use of precision alignment jigs increases both the speed and accuracy with which the system is aligned. The calibration of the force measurement system shows that the methods and equipment for this procedure can be successful.

515,221
N85-12904/7/GAR PC **A04/MF A01**
Eidgenoessisches Flugzeugwerk, Emmen (Switzerland).
Untersuchung Zur Verbesserung der Transonic-Kanal-Messstrecke des Eidgenoessisches Flugzwerke, Emmen (Investigation for the Improvement of the Transonic Tunnel Working Section of the Emmen Federal Aircraft Works (Switzerland)).
G. Capitaine. 20 Oct 83, 75p FW-FO-1681
Text in German.

Wall interference correction in transonic wind tunnels for three dimensional models is treated. Slotted measuring section configurations and their effects on the flow conditions in empty tunnels and on models were investigated. Main characteristics for Mach numbers 0.65 M 1.0 are : axial pressure gradient 0.002; drag coefficient 0.0002; standard deviation of Mach number distribution 0.002 and angle of attack = - 2 deg.

515,222
N85-13155/5/GAR PC **A02/MF A01**
Royal Signals and Radar Establishment, Malvern (England).
Implementing Waveguide Bandwidth Six-Port Reflectometer Circuits at Millimetric Wavelengths.
L. D. Hill. May 84, 17p RSRE-MEMO-3678, BR92490

The implementation of two WG22 six-port reflectometer circuits for the measurement of complex voltage reflection coefficients is described. The phase compensation required to enable these two six-port circuits to operate over the 26.5 to 40 GHz band, using commercially available directional couplers, is outlined. An automated WG22 six-port reflectometer operated at 0.5 GHz intervals over the full waveguide bandwidth is reported. To implement these circuits in other millimetric bands, the directional couplers need a nominal directivity of 30 dB and the coupled/transmitted phase relationship should track with frequency within 15 deg over the whole waveguide band.

515,223
N85-13205/8/GAR PC **A07/MF A01**
California Univ., Berkeley.
Study of Instrument Design Options for the Columbus Spectroscopy Mission.
Semiannual Report.
M. Hettrick, and S. Bowyer. 1984, 134p NAS 1.26:174072, NASA-CR-174072
Contract NAG5-420

Design work carried out as part of the pre-phase A studies in support of an orbiting COLUMBUS spectroscopy observatory is summarized. Also included are new findings resulting from a reanalysis initiated in response to the following guidelines: (1) The strawman satellite design, which assumed a telescope 6 meters in length followed by a 3-meter spectrograph, resulted in an observatory which was prohibitively costly; (2) Systems which optimize effective area and provide 40 arc second fields are examined; (3) Systems not containing entrance apertures were found undesirable; and (4) The normal incidence Rowland circle design is analyzed. The following instrument design options were analyzed: (1) The 1/2 Meter Telescope Rowland Circle Spectrometer; (2) A 1 Meter Telescope with a Rowland Circle Spectrometer; (3) A New Design Grazing Incidence Telescope with a Berkeley Grazing Incidence Echelle Spectrometer; and (4) A New Design Grazing Incidence Spectroscopic Telescope with Rowland Circle Spectrometer.

515,224
N85-13215/7/GAR PC **A09/MF A01**
Valvo G.m.b.H., Hamburg (Germany, F.R.).
Development of Components for Micro-C Oriented Sensor Systems.
Final Report, Mar. 1983.
G. Andrae, W. Demmer, P. Draheim, H. Sauermann, and W. Germer. Jul 84, 192p BMFT-FB-T-84-126
In German; English Summary. Sponsored by Bundesministerium fuer Forschung und Technologie.

A low cost technology for the detection of pressure and force and a digital electronic device for signal conditioning were developed. A thin silicon film plane pressure sensor for pressures between 1 and 10 bar in liq-

uids and gases which do not attack the CuBe of the metal spring or the plastic envelope was built. A microcomputer compatible sensor system was developed. The sensor signal is time-analogously transformed to a double valued signal which can be recorded by a microcomputer.

515,225
N85-13216/5/GAR PC **A04**/MF **A01**
Krohne Messtechnik G.m.b.H. und Co. K.G., Duisburg (Germany, F.R.).
Magnetic Inductive Flowmeter for Low Conducting Liquids.
Final Report, Dec. 1981.
F. Hofman, R. Kuerten, and R. Vanderpol. Jun 84, 68p BMFT-FB-T-84-136
In German; English Summary. Sponsored by Bundesministerium fuer Forschung und Technologie.

A flow head for magnetic inductive flowmeters for low conducting liquids was constructed. A higher frequency than usual in industrial MJ magnetic inductive flowmeters was chosen to get a higher signal to noise ratio. The failure curve of the system is highly influenced by the shift of the zero point. The achieved zero stability allows no commercial applications.

515,226
N85-13217/3/GAR PC **A03**/MF **A01**
Rohde and Schwarz, Munich (Germany, F.R.). Hauptabteilung Analog- und HF-Messgeraete.
Development of a Feasibility Model for a Thin-Film Precision Power Meter.
Final Report, Dec. 1983.
H. Delfs, F. Dosch, and A. Loeser. Aug 84, 32p BMFT-FB-T-84-161
In German; English Summary. Sponsored by Bundesministerium fuer Forschung und Technologie.

The development of a thermally coupled transducer and its evaluation circuit for a precision power meter is described. A thin film transducer made up of two temperature sensors and operating in a bridge configuration has the advantages of dc coupling for the RF circuit, very fast transient response and very good RF matching up to the GHz region.

515,227
N85-13218/1/GAR PC **A03**/MF **A01**
Valtion Teknillinen Tutkimuskeskus, Espoo (Finland).
Instrumented Impact Testing Machine with Reduced Specimen Oscillation Effects.
R. Rintamaa, K. Ranka, K. Wallin, K. Ikonen, and H. Talja. Jul 84, 46p VTT-290, ISBN-951-38-2098-X
Sponsored by Finnish Ministry of Trade and Industry.

A pendulum-type instrumented Charpy test apparatus based on inverted test geometry was developed. Geometry inversion reduces inertia load and specimen oscillation effects. Initial impact energy is double that of standard (300 J) impact testers, allowing the use of larger (10 x 20 x 110 mm) bend specimens than normal Charpy specimens. The rotation axis in the three point bending is nearly stationary, making COD-measurements possible. Inertia effects and specimen oscillations are compared with the conventional tester, and using an analytical finite element model for Charpy V-notch specimens. Better performance for the inverted geometry is reported.

515,228
N85-13282/7/GAR PC **A02**/MF **A01**
Centre Technique des Industries Mecaniques, Saint-Etienne (France).
Methode d'Essais de Telecabines (Test Methods for Cable Cars).
Final Report.
E. Babaud. Feb 83, 24p CETIM-1-5K-45-1
Text in French.

A cable car test method consisting of excitation with a random multifrequency Gaussian load with a given bandwidth and measuring system response at a single point is proposed. The study was done to improve winter sport transport equipment test procedures, which are limited to sinusoidal loads. The Locati fatigue method increases the load by steps till structural failure. The number of cycles of each step is determined as a function of the material Wohler curves.

515,229
N85-13553/1/GAR PC **A03**/MF **A01**
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
Evaluation of the Langley 4- by 7-Meter Tunnel for Propeller Noise Measurements.
P. J. Block, and G. L. Gentry. Dec 84, 29p NAS 1.15:85721, L-15738, NASA-TM-85721

An experimental and theoretical evaluation of the Langley 4- by 7- Meter Tunnel was conducted to determine its suitability for obtaining propeller noise data. The tunnel circuit and open test section are described. An experimental evaluation is performed using microphones placed in and on the tunnel floor. The reflection characteristics and background noise are determined. The predicted source (propeller) near-field/far-field boundary is given using a first-principles method. The effect of the tunnel-floor boundry layer on the noise from the propeller is also predicted. A propeller test stand used for part of his evaluation is also described. The measured propeller performance characteristics are compared with those obtained at a larger scale, and the effect of the test-section configuration on the propeller performance is examined. Finally, propeller noise measurements were obtained on an eight-bladed SR-2 propeller operating at angles of attack -8 deg, 0 deg, and 4.6 deg to give an indication of attainable signal-to-noise ratios.

515,230
N85-13555/6/GAR PC **A03**/MF **A01**
Centro Informazioni Studi Esperienze, Milan (Italy).
Qualificazione di Sistemi Non-Invasivi Per la Rivelazione on-Line di Perdite in Preriscaldatori d'Acqua Alimento AD Alta Pressione (Qualification of Noninvasive Systems for on-Line Leak Detection in High Pressure Feed Water Preheaters).
M. Famiglietti, and S. Ghia. 1984, 28p CISE-2341
In Italian; English Summary. Presented at Ati-Aipnd Conv. Scambiatori Per Il Ciclo Termico Nelle Unita di Potenza Ed Industriali Ricerca E Sviluppo Progettazione Costruzione Esercizio Controlli, Segrate Italy, 1 Jun. 1984.

A monitoring system for tube rupture in high pressure preheaters is presented. An acoustic emission transducer set on the outer part of the component is used for the continuous monitoring of ultrasonic noise caused by turbulent flow from rupture. The results obtained in 3yr of experimental activity in laboratory and in power plants show good performance and reliability of the system.

515,231
N85-13556/4/GAR PC **A12**/MF **A01**
Centre Technique des Industries Mecaniques, Saint-Etienne (France).
Mesure des Precharges de Serrage dans les Assemblages Boulonnes Par Methode Ultrasonore (Measurement of the Preloading of Bolted Joints by the Ultrasonic Method).
Final Report.
M. Sorel, J. Aubert, and A. Brand. Sep 83, 254p CETIM-1-5H-38-6
Text in French.

The application of ultrasonic measurements to determine bolt preloading is studied. An ultrasonic trasducer is placed in direct contact with the bolt during preloading. A preloading tool with a transducer incorporated is described. It is shown that the chronometric ultrasonic method measures preloading with an accuracy of 5%. Experimental results obtained in full scale industrial application are presented.

515,232
N85-13594/5/GAR PC **A03**/MF **A01**
Opcoa, Inc., Santa Ana, CA.
Fiber Optic, Fabry-Perot High Temperature Sensor.
Final Report.
K. James, and B. Quick. Nov 84, 28p NAS 1.26:174712, NASA-CR-174712
Contract NAS3-23522

A digital, fiber optic temperature sensor using a variable Fabry-Perot cavity as the sensor element was analyzed, designed, fabricated, and tested. The fiber transmitted cavity reflection spectra is dispersed then converted from an optical signal to electrical information by a charged coupled device (CCD). A microprocessor-based color demodulation system converts the wavelength information to temperature. This general sensor concept not only utilizes an all-optical means of parameter sensing and transmitting, but also exploits microprocessor technology for automated control, calibration, and enhanced performance. The complete temperature sensor system was evaluated in the laboratory. Results show that the Fabry-Perot temperature sensor has good resolution (0.5% of full scale), high accuracy, and potential high temperature (1000 C) applications.

515,233
PAT-APPL-6-663 969/GAR PC **A02**/MF **A01**
Department of Health and Human Services, Washington, DC.
Transducer Hydrophone with Filled Reservoir.
Patent Application,
G. R. Harris, and A. S. De Reggi. Filed 23 Oct 84, 16p PB85-141778
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A hydrophone device with one or more very small active spots located on a large continuous ferroelectric sheet, such as PVDF, overcomes many of the problems in prior art constructions associated with the high dielectric constant of various media in which the device is used. Additional improvements include increased signal to noise ratio and a sensitivity independent of the medium properties. The hydrophone device includes a piezoelectrically active sheet stretched and clamped on over the top of a hoop ring. A backing is attached to the back of the hoop ring. A low-dielectric material fills the space between the backing and the sheet. This material eliminates the capacitive loading effect which would otherwise be presented by the medium being probed.

515,234
PATENT-4 487 693 Not available NTIS
Department of Health and Human Services, Washington, DC.
Multi-Layer Coil Countercurrent Chromatograph with Adjustable Revolutional Radius.
Patent,
Y. Ito. Filed 23 Nov 83, patented 11 Dec 84, 6p PB85-143816, PAT-APPL-6-554 795
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $1.00.

The invention is a flow-through apparatus for two-phase countercurrent chromatography consisting of a multi-layer helically coiled column carried on a flanged reel mounted on a frame revolving on a first axis. The reel rotates on a second axis parallel to and spaced from the first axis, at the same angular velocity and in the same direction as the frame to prevent twisting of its inlet and outlet flow tubes, which extend through an axial passage in a shaft portion of the reel. The reel has opposite shaft portions which are journalled in detachable opposite bearing blocks carried by the frame.

515,235
PB85-136378/GAR PC **E04**/MF **E04**
National Physical Lab., Teddington (England). Div. of Information Technology and Computing.
Automatic Analysis of Speckle Photographs by Microcomputer,
P. J. Pobgee. c1984, 43p NPL-DITC-47/84

This report describes the automation of a technique, previously developed by the Division of Mechanical and Optical Metrology for measuring small displacements of engineering surfaces. The behavior of engineering structures or components under load can often be tested by observing the resultant local movement of points on their surfaces. These movements are usually microscopic and optical interference techniques are needed to resolve them. Speckle photography is a simple non-contacting method for measuring these displacements. Although the simplicity of recording the information is potentially very attractive, manual analysis of the photographs can be tedious and time consuming. This report describes a system which automates the process using a microcomputer to control the scanning of the photograph and to carry out interpretation and measurement of the fringe patterns produced.

515,236
PB85-138642/GAR PC **A05**/MF **A01**
Factory Mutual Research Corp., Norwood, MA.

Fail-Safe Devices for the Prevention of Hazardous Material Spills.
Final rept. Dec 79-81,
D. B. Heard. Dec 84, 84p EPA/600/2-84/189
Contract EPA-68-03-2054

Hazardous material spills have often been caused by over filling containers. Many spills could be prevented by using automatic container-filling procedures to determine when maximum capacity is reached. This project conducted an assessment of current technology, including laboratory testing of devices and performance monitoring of on-site automatic level controllers. Three industrial plants cooperated in the field testing phase, each having a different problem with a different material. The types of level control devices chosen were ultrasonic, vibrating tines, and a magnetic-coupled float unit. Two of the units were activated by electricity, and the third was pneumatic. One unit controlled dry powder; the second, a viscous liquid; and the third, an aqueous liquid. Each location required an explosion-proof system. All were subjected to the extremes of weather, and all were installed without significant revisions to existing containers. The on-site experience at host plants demonstrated that fail-safe level controllers can work well for an extended period under severe weather conditions. The proper controller configuration must be chosen to be compatible with the environment and with the material being controlled. Controllers should incorporate requisite safeguards to assure safety and be resistant to corrosion, fouling and weather.

515,237
PB85-143139/GAR PC **E04/MF E04**
Central Electricity Generating Board, Southampton (England). Technology Planning and Research Div.
Sodium Chemistry in the MEL In-Sodium Creep Facilities,
B. H. Targett, and R. S. Fidler. c1984, 34p TPRD/M/1435/N84

This Note describes the techniques and results of measuring impurity concentrations in the liquid sodium of the MEL creep-test facilities. A knowledge of sodium composition is an essential prerequisite for comparing the experimental conditions with those in an operating fast reactor or in other experiments. A primary objective of the work was to obtain a reliable measurement of the oxygen concentration and to confirm that the conditions remained stable, equivalent to those expected in normal fast reactor plant operation. Three independent techniques are available for this purpose, allowing the accuracy and precision of the results to be compared for an in-line distillation sampler, a plugging meter and an electrochemical oxygen meter. All three methods responded to changes in cold trap temperature and were mutually consistent.

515,238
PB85-143279/GAR PC **A05/MF A01**
Life Systems, Inc., Cleveland, OH.
Standard Operating Procedures for Conducting Sampling and Sample Bank Audits,
T. W. Owens, and D. J. Northington. Jan 85, 79p
EPA/600/4-85/003
Contract EPA-68-03-3136

The U.S. Environmental Protection Agency's (USEPA) Environmental Monitoring Systems Laboratory-Las Vegas (EMSL-LV) is responsible for preparing Standard Operating Procedures (SOPs) for auditing sampling and sample bank activities performed under the Resource Conservation and Recovery Act (RCRA) as well as conducting field audits of these activities when they are performed by EPA and EPA contractors. Although SOPs for auditing analytical methods and laboratory practices have been developed, guidelines for conducting evaluations of sampling and sample bank activities are generally lacking. This SOP provides the Agency with such guidelines for evaluating and auditing sample collection and sample bank activities. The SOP provides audit personnel with a description of the components and organization of an audit program. Also discussed are administrative and procedural functions necessary to initiate, conduct and complete the audit and suggested qualifications and training requirements for audit personnel. The Appendix of the SOP provides checklists for use in conducting the audit. Checklists are presented for identifying and/or evaluating the use of proper sampling equipment and materials, sampling methodology, packaging, labeling and shipment of samples, quality assurance/quality control (QA/QC) protocols, sampling plans and sampling personnel.

515,239
PB85-144046/GAR PC **A04/MF A01**
Battelle Columbus Labs., OH.
Evaluation of Cryogenic Trapping As a Means for Collecting Organic Compounds in Ambient Air,
M. Holdren, S. Rust, R. Smith, and J. Koetz. Jan 85, 57p EPA/600/4-85/002
Contract EPA-68-02-3487

The methodology used in reduced temperature preconcentration of volatile organic compounds has been tested using a prototype automated gas chromatographic system. Mixtures of sixteen volatile organic compounds in humidified zero air were passed through a Nafion tube dryer and the organic compounds were collected on a reduced-temperature trap. The dryer reduced the water concentration without significantly affecting the integrity of the trace organic species. The selective reduction of water vapor improves the chromatography of the trace organics and likewise permits processing larger sample volumes. Statistical analysis of the data indicated that the canisters would serve as acceptable storage vessels for most of the volatile organic compounds tested.

515,240
PB85-144053/GAR PC **A10/MF A01**
Environmental Monitoring Systems Lab., Research Triangle Park, NC.
Proceedings: National Symposium on Recent Advances in Pollutant Monitoring of Ambient Air and Stationary Sources, Held at Radison Plaza Raleigh Hotel, on May 8-10, 1984.
Nov 84, 213p EPA/600/9-84/019

The fourth annual national symposium sponsored by EPA's Environmental Monitoring Systems Laboratory was held May 8-10, 1984 in Raleigh, North Carolina. In seven sessions over three days, papers and discussions focused on state-of-the-art systems for monitoring source emissions, ambient air, acid deposition, hazardous emissions and personal monitoring. This symposium is part of a continuing effort to explore recent advances in pollutant monitoring of ambient air and stationary sources. It serves as a forum for exchange of ideas and scientific information. In response to the Agency regulatory needs, this symposium focused on acid deposition, personal exposure and toxic substances. This publication is intended to assist those researchers interested in furthering the science of air monitoring. The papers in this proceedings are abbreviated versions of those presented by the speakers. Several papers are omitted because the speakers did not submit them in time for the agency's peer review.

515,241
PB85-144681/GAR PC **E05/MF E05**
CEA Centre d'Etudes Nucleaires de Grenoble (France). Dept. de Recherche Fondamentale.
Spectroscopie de Muons (Muon Spectroscopy),
J. Chappert. Jul 84, 97p
Text in French. Sponsored by Centre de Documentation de l'Armement, Paris (France). Direction des Recherches, Etudes et Techniques.

This report was prepared upon a request by the Administration of Research, Studies and Techniques (DRET). It does not pretend to be thorough and complete. Its objective is to provide an improvement in the utilization of muon spectroscopy, to present the present research approaches, and to illustrate them with the help of typical examples of applications in condensed-material physics (physical metallurgy, electronic and magnetic properties) and in chemistry (reaction kinetics, free radicals).

515,242
PB85-144855 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Wideband Sampling Wattmeter.
Final rept.,
G. N. Stenbakken. Oct 84, 8p
Pub. in IEEE (Institute of Electrical and Electronics Engineers) Transactions on Power Apparatus and Systems PAS-103, n10 p2919-2926 Oct 84.

The design and operation of a wideband sampling wattmeter capable of measuring distorted power signals with fundamental frequencies from 1 Hz to 10 kHz and harmonics up to 100 kHz is described. The microprocessor controlled wattmeter uses asynchronous sampling of the voltage and current signals. The errors associated with this type of operation are described as are various methods of correcting for some of these errors. The wattmeter uses a both a hardware multiplier-accumulator and a direct-memory-access unit to capture the data. Differential time delays in the input channels can be compensated by programmable time delay circuits. Performance checks show that measurement uncertainties of less than plus or minus .1 percent of full-scale range (FSR) are obtainable.

515,243
PB85-144913 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Measurement of High Current and Voltage Pulses.
Final rept.,
R. E. Hebner. 1984, 45p
Grant AFOSR-78-3675
Sponsored by Air Force Aero Propulsion Lab., Wright-Patterson AFB, OH., and Air Force Weapons Lab., Kirtland AFB, NM.
Pub. in Air Force Pulsed Power Lecture Series, Lecture No. 25, 45p 1984.

The note introduces some of the fundamental approaches to the measurement of voltage or current pulses. The evaluation of the measurement process and the properties of selected devices -- resistive and capacitive probes, shunts, and transformers -- are highlighted. Electro-optical measurement of voltage and magneto-optical measurement of current are also discussed.

515,244
PB85-144962 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Capacitive Sensors for Voltage Measurements in Pulse Power Systems.
Final rept.,
R. H. McKnight, and H. K. Schoenwetter. 1984, 4p
Pub. in IEEE (Institute of Electrical and Electronics Engineers) Cat. No. CH84-2056-0, p284-287 1984.

Capacitive E-Field sensors are frequently used in pulse power systems to measure voltage waveforms. Even though these sensors, often called 'E-dot' sensors, are intrinsically simple in design and application, accepted techniques to evaluate their performance are not generally available. A laboratory test line has been constructed to facilitate detailed examination of the electrical characteristics of the sensors and to allow investigation of methods of calibrating such devices. Both discrete frequency and step-like signals can be placed on the line and the response of the sensor determined. Two different probe geometries have been studied with each showing the characteristic behavior of the capacitive sensor, including nanosecond rise time. The use of active electronic techniques has also been explored to extend the low frequency bandwidth of the measuring system. Sensors with a wide bandwidth are required for measurements of disconnect transients in gas-insulated power frequency equipment.

515,245
PB85-144988 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Use of Drill-Up for On-Line Determination of Drill Wear.
Final rept.,
K. W. Yee. 1984, 12p
Pub. in Society of Manufacturing Engineers Technical Paper MS84-914, p1-12 1984.

Drill-Up is an instrument for determining drill wear and predicting drill breakage by applying time-domain analysis to a signal from an accelerometer coupled to the workpiece. The potential of Drill-Up as a drill wear-out sensor for automated drilling machines has been demonstrated for a limited range of drill sizes and materials. Worn-out drills in moderately hard steel can be readily detected. In softer low-carbon steel, detection is possible if the techniques suggested are used to overcome practical problems.

515,246
PB85-151447/GAR PC **A06/MF A01**
United States Metric Board, Arlington, VA.
Federal Metric Status: Report by the Members of the Interagency Committee on Metric Policy (ICMP).
Jan 81, 103p
See also PB85-151454.

This report discusses the results of a survey on metric activities during 1980 in the federal government. The

survey was distributed to members of the Interagency Committee on Metric Policy (ICMP), which is composed of 37 agencies established to coordinate and provide policy guidance regarding U.S. Government efforts to implement metric conversion, under the auspices of the United States Metric Board (USMB).

515,247

PB85-151454/GAR PC **A03**/MF **A01**
United States Metric Board, Arlington, VA.
U.S. Metric Board: Summary Report, July 1982.
Jul 82, 47p
See also PB85-151462.

This report contains the U.S. Metric Board's findings and recommendations for consideration by Congress and the Administration in continuing governmental involvement in future metric activities. Each Board member represents a particular constituency and has brought his or her expertise and outlook to bear on metric issues in this country. Their statements follow and provide their perspectives on metrication as they reflect on their service on the Board.

515,248

PB85-151462/GAR PC **A03**/MF **A01**
United States Metric Board, Arlington, VA.
Perspective on Roles in Future Metric Coordinating Activity: The Views of Principal Metric Conversion Planning and Coordinating Organizations.
Jul 82, 46p
See also PB85-151470.

This report was to be the Board's last report, and therefore it was to be a summary report that would articulate the Board's activities and set forth the major Findings and Recommendations of the Board drawn from its Research, Coordination, and Public Awareness and Education activities. The Findings are based on knowledge primarily gained through the Board's research program and the Board's introspective look at what it has learned over the past four years about metrication in the United States. The Recommendations of the Board are directed to the Congress, the Administration, Federal agencies, and the Department of Commerce as successor to the Board and represent the Board's advice as to what needs to be done to carry out the interests of the Metric Conversion Act.

515,249

PB85-151579 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Approach to Realism in Field Ion Microscopy via Zone Electropolishing.
Final rept.,
A. J. Melmed, and J. J. Carroll. 1984, 2p
Pub. in Jnl. of Vacuum Science and Technology A2, n3 p1388-1389 Jul/Sep 84.

A method of specimen preparation for field ion microscopy and atom probe analysis is presented which allows the preparation of specimens from a wide variety of initial morphologies.

515,250

PB85-151637 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Investigations in Array Sizing. Part 1. Accuracy of the Sizing Process.
Final rept.,
A. W. Hartman. 1984, 10p
Pub. in Powder Technology 39, p49-59 1984.

The technique of two-dimensional array sizing by optical microscopy is investigated for use in the determination of the average diameter of 0.9 micrometers polystyrene latex spheres. Error sources for the diameter measurement are discussed, including the effects of microcracks, anisotropy, and dissolved impurities. The technique has been used in a particle calibration program at NBS. The average diameter found was 0.897 + or - 0.016 micrometers, while techniques based on light scattering from a single particle and from a suspension yielded 0.900 + or - 0.011 and 0.895 + or - 0.008 micrometers, respectively.

515,251

PB85-157550/GAR PC **A13**/MF **A01**
National Bureau of Standards, Gaithersburg, MD.
Specifications, Tolerances, and Other Technical Requirements for Weighing and Measuring Devices as Adopted by the 69th National Conference on Weights and Measures, 1984 (1985 Edition).
Final rept.,
O. K. Warnlof. Nov 84, 297p NBS/HB-44/1985
Supersedes PB84-125764. Also available from Supt. of Docs as SN003-003-02625-5.

The specifications, tolerances, and other technical requirements published herein comprise, in their latest form, all of the current codes as adopted by the National Conference on Weights and Measures. The National Conference is sponsored by the National Bureau of Standards (NBS), which organization provides its secretariat and publishes its documents. The NBS also develops technical publications for use by weights and measures agencies; these publications may subsequently be endorsed or adopted by the NCWM. The purpose of these technical requirements is to eliminate from use weights and measures and weighing and measuring devices that are false, that are of such construction that they are faulty (that is, that are not reasonably permanent in their adjustment or will not repeat their indications correctly), or that facilitate the perpetration of fraud but, without prejudice to apparatus that conforms as closely as practicable to the official standards.

515,252

PB85-854792/GAR PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Air Sampling Devices. March 1976-January 1985 (Citations from the Energy Data Base).
Rept. for Mar 76-Jan 85.
Feb 85, 240p
Supersedes PB84-859123. Prepared in cooperation with Department of Energy, Washington, DC.

This bibliography contains citations concerning the design, calibration, and testing of air samplers. Excluded are citations which report on results of monitoring, except when such monitoring is used for comparative evaluations of different types of air samplers. Much of the emphasis is placed upon inlet design, portability, and sensing of ultrafine and inhalable particles. Applications include air pollution sampling, well-logging, mine atmospheres, radionuclides, workplace atmospheres, and hazard alarms. (This updated bibliography contains 304 citations, 52 of which are new entries to the previous edition.)

14C. Recording Devices

515,253

AD-A148 877/4/GAR PC **A02**/MF **A01**
Scripps Institution of Oceanography, La Jolla, CA. Marine Physical Lab.
Active Baffle Development under ACSAS Task II Hydrophone and Inner Decoupler.
Final rept. 3 Jun 82-31 Oct 83,
V. C. Anderson. 6 Nov 84, 4p Rept no. MPL-U-71/84
Contract N00014-82-K-0588

Initial studies in the active baffle project were carried out under this contract, but before any significant results could be achieved effort was diverted to the development of the high speed recording system for ACSAS KAMLOOPS tests. During the initial studies an automated data collection system was assembled to obtain the phase and amplitude characteristics of the mechanical transfer functions of candidate active baffle breadboard systems. Pilot tests with an absorptive elastomer electrostatic transducer were carried out but no conclusive results were obtained.

515,254

PB85-855021/GAR PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Magnetic Recording Tape. June 1970-January 1985 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jan 85.
Feb 85, 186p
Supersedes PB84-857382.

This bibliography contains citations concerning the manufacture, testing, and evaluation of magnetic tapes for computers, video recording, and audio recording. Manufacture includes tape material, tape slitting, magnetic materials, coating, and orientation of coating particles. Testing includes determining properties of the materials, effects of heat, aging, and deformation on the tape, and methods and results of testing for noise, particle size, dropout, and wear. Evaluation includes some applications to demonstrate the effectiveness of certain design and material properties. (This updated bibliography contains 293 citations, 67 of which are new entries to the previous edition.)

14D. Reliability

515,255

N85-13257/9/GAR PC **A07**/MF **A01**
Centre National d'Etudes Spatiales, Toulouse (France).
L'Organisation de la Qualite (Quality Organization).
C. Petitdemange. Apr 83, 139p CNES-NT-106
In French; English Summary.

The goals, means and organization of quality control are discussed. Quality manuals, corrective and preventive actions, control planning, and quality audits are described.

515,256

N85-13260/3/GAR PC **A09**/MF **A01**
Societe Nationale Industrielle Aerospatiale, Suresnes (France). Lab. Central.
Seuil de Detectabilite des Defauts dans les Assemblages Rives, Proces-Verbal No.44-833/F (Defect Detection Threshold in Riveted Joints, Test Report No.44-833/F).
D. Lecuru. 2 Feb 84, 195p
Contract STPA-80.96.025
Text in French.

The utilization of ultrasonic and Foucault currents for the detection of fatigue cracks in rivet holes is studied in order to determine the levels of detection thresholds and assured detection. Longitudinal aluminum riveted joints of the type used in aircraft structures were tested by operators with different training levels. The apparatus and control methods are described. It is shown that the detection level is significantly dependant on operator expertise.

14E. Reprography

515,257

PB85-854933/GAR PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Nonimpact Printing Technology. 1975-February 1985 (Citations from the INSPEC: Information Services for the Physics and Engineering Communities Data Base).
Rept. for 1975-Feb 85.
Feb 85, 75p
Supersedes PB84-861269.

This bibliography contains citations concerning a market overview of the various nonimpact printers as well as their capabilities and specifications. Technological reviews and equipment comparisons, including speed, quality, and principles and operational performance are discussed. A variety of applications are also presented. (This updated bibliography contains 103 citations, 20 of which are new entries to the previous edition.)

15. MILITARY SCIENCES

15B. Chemical, Biological, and Radiological Warfare

515,258
AD-A148 861/8/GAR PC **A02/MF A01**
Army War Coll., Carlisle Barracks, PA.
USAWC (United States Army War College) Military Studies Program. Logistical Support for Chemical Special Ammunition in a Theater of Operations.
Study project,
C. V. Glover. May 84, 25p

An assessment is made of our current supply of lethal and incapacitating chemical ammunition (chemical special ammunition) in a theater of operations. The study considers the current organizations which are tasked with the storage of chemical special ammunition outside of CONUS. It reviews their current capability as constrained by logistical support to a theater. The findings are based upon extensive research of literature, review of previous chemical logistical studies and interviews with knowledgeable personnel. From analysis of all factors, it is concluded that the Army has a void in service doctrine concerning the management of chemical special munitions within a theater. The study recommendations should be used to improve the shortfalls identified in the logistical system for chemical special ammunition management within theater of operations. (Author)

515,259
AD-A149 088/7/GAR PC **A23/MF A01**
Battelle Columbus Labs., OH.
Guidelines - Design to Minimize Contamination and to Facilitate Decontamination of Military Vehicles and Other Equipment: Interiors and Exteriors.
Special publication for period ending Jun 82,
T. E. Hill, C. V. Robinson, J. M. Tierney, and J. H. Thompson. Aug 84, 532p CRDC-SP-84023

This report provides guidelines for designing military vehicles and other equipment to minimize contamination by nuclear, biological, and chemical agents and to increase the effectiveness of decontaminaiion processes. These guidelines do not presume to dictate requirements for the layout, configuration, or construction of military hardware, nor do they prohibit presently used design techniques. Problems of contamination and decontamination are brought to the attention of designers. Approaches to reduce the size of these problems are suggested.

15C. Defense

515,260
AD-A148 851/9/GAR PC **A04/MF A01**
Army War Coll., Carlisle Barracks, PA.
Strategy, Policy and Contingency Planning. The US Defense Planning Process.
Study project rept.,
J. R. Carlson, M. J. Sierra, and P. A. King. 23 May 84, 68p

There is concern that the US defense planning process has difficulty in translating national-level policy guidance into viable defense contingency plans which, if implemented, produce winning outcomes. Some of the concerns center on the planning outcomes such as those achieved during the abortive mission to rescue the American hostages in Iran; the 1975 Mayaguez rescue operation; the 1970 North Vietnam Sontay prison raid to free US prisoners of war; the Beirut terrorist bombing where 241 servicemen were killed; and even the successful 1983 Grenada invasion hailed as a success, yet faulted for major command and intelligence lapses. The study analyzed the current defense planning process; its current day viability; its relationship with National Command Authority guidance; and interviewed key planning officials throughout the Departments of Defense and State, and the National Security Council. It was concluded that the US defense planning process is functioning but not as specifically intended and is in need of corrective action and direction, especially in the area of crisis contingency planning.

515,261
AD-A148 950/9/GAR PC **A02/MF A01**
Army War Coll., Carlisle Barracks, PA.
Indonesian Defense Strategy: An Appraisal of Requirements, Resources, Capabilities, and Directions.
Student essay,
R. F. Harris. 7 May 84, 25p

A 20 page essay which analyzes current threats to Indonesian security and assesses Indonesian capabilities to counter those threats. It investigates Indonesian strategic and military objectives, describes the concept of territorial warfare, lists current force structure and major air and naval combatants, and assesses the adequacy of current military capabilities. It addresses some current military issues which degrade that capability and assesses the Indonesian armed forces overall ability to accomplish their designed role.

15D. Intelligence

515,262
AD-A149 072/1/GAR PC **A02/MF A01**
Army War Coll., Carlisle Barracks, PA.
Thoughts on SOF Deployment for Deep Battle HUMINT Operations.
Student essay,
H. Booth. 25 May 84, 23p

Technical intelligence collection is perceived as inadequate for collection of adequate information on enemy intent, disposition and capability in the deep battle zone upon commencement of hostilities. This essay examines the feasibility of using US Army SF assets for the collection of HUMINT intelligence in the deep battle zone. The case for selecting Special Forces rather than Rangers is discussed. An examination is made on training, sustainment, and selection of personnel for this type of mission. The development and criteria for HUMINT sources is covered and a preference for operating agencies to work in conjunction with the SF command is recommended. Further comment is made on command and control for this type of mission and the level within a theater of operations where the support and conduct of HUMINT operations should be conducted. Problems and limitations generated by the threat are examined and equipage of teams touched upon with emphasis on the need for passivity. All data was taken from unclassified material and limited personal observation of SF personnel, principally Special Forces engaged in military training team activities at First Special Forces Operations command at Fort Bragg, North Carolina.

15E. Logistics

515,263
AD-A148 878/2/GAR PC **A07/MF A01**
Product Performance Agreement Center, Wright-Patterson AFB, OH.
Product Performance Agreement Center Proceedings Held at Dayton, Ohio on 18-19 June 1984.
19 Jun 84, 139p

The Air Force Acquisition Logistics Center sponsored the first annual Product Performance Agreement Center (PPAC) Symposium in June 1984. PPAC is a joint AFSC/AFLC organization that serves as a focal point for warranty data collection and analysis, coordinating all Product Performance Agreement (PPA) characteristics. The symposium served as an open forum for Government and Industry to discuss PPAs and reliability expectations.

515,264
PB85-144186/GAR PC **A03/MF A01**
General Accounting Office, Washington, DC. National Security and International Affairs Div.
DOD (Department of Defense) Manufacturing Technology Program--Management Is Improving but Benefits Hard to Measure.
30 Nov 84, 50p GAO/NSIAD-85-5, B-207974

The DOD Manufacturing Technology Program provides money, mainly to defense contractors, to demonstrate initial 'factory floor' application of new or improved technology to produce defense items. Goals are to improve productivity and decrease Defense acquisition costs. GAO reviewed the program's effectiveness and management. Defense officials and defense contractors believe this program is achieving useful results--reductions in defense acquisition costs, and in other ways, such as improved maintainability of defense equipment. However, there is neither a Defense wide system to collect information on program results, nor a consensus on what criteria to apply to judge overall program effectiveness. Accordingly, individual judgments vary as to how successful the program is. Defense's planning and monitoring of the program has improved since 1979, when GAO last reviewed the program. However, Defense needs to increase the likelihood that successful project results will be used on defense production, and establish a uniform evaluation system for the program. GAO makes recommendations to improve program management.

15F. Nuclear Warfare

515,265
DE85000457/GAR PC **A02/MF A01**
Sandia National Labs., Albuquerque, NM.
Theory of Lethality.
J. S. Browning. 1984, 12p SAND-84-1995C, CONF-8411106-1
Contract AC04-76DP00789
Air Force/Navy science engineering symposium, Norfolk Naval Air Station, VA, USA, 14 Nov 1984.

Today the basic concepts and definitions essential to the development of a theory of lethality have not been established. For the most part, lethality is not considered an engineering problem. Rather, lethality studies are conducted on an intuitive basis with the emphasis placed on discovering an emotional appeal to help secure a favorable political climate for the continued existence of weapon system programs. As a consequence, the lethality of advanced weapon concepts is difficult to establish and lethality considerations are secondary, and perhaps even optional, to the thrust of a technology program. It is the author's contention that lethality is, at best, a poorly understood concept, but that a general theory of lethality can be developed which will permit lethality studies to be performed systematically and to produce credible results. A definition of lethality is presented that requires accurate and efficient evaluation of the survivability of the target systems. Methods for evaluating the survivability of a target system are discussed. A life cycle concept of lethality is introduced which may assist management of 6.1 through 6.4 programs. The author's observations are based upon experiences while participating in the Air Force Neutral Particle Beam Program. (ERA citation 10:003236)

515,266
DE85001169/GAR PC **A02/MF A01**
Oak Ridge National Lab., TN.
Sulfur Activation in Electric Pole Insulators in Hiroshima.
J. V. Pace, and G. D. Kerr. 1983, 3p CONF-8311200-1
Contract AC05-84OR21400
US/Japan joint workshop on a-bomb dosimetry reassessment, Hiroshima, Japan, 8 Nov 1983.

The scalar neutron fluences at Hiroshima were folded with directional S(n,p)P responses to obtain a more precise prediction of the sulfur activation. The weapon detonated over Hiroshima had a twelve to fifteen degree tilt relative to the vertical. The effect of the tilt on sulfur activation was accounted for by making a two-dimensional, cylindrical, semi-infinite air calculation. Results showed that the directional S(n,p)P re-

sponses varied by five to fifteen percent from the top of the insulation to the side for different energy groups. 4 references. (ERA citation 10:003234)

515,267
DE85002172/GAR PC **A02/MF A01**
Lawrence Livermore National Lab., CA.
Neutron and gamma-Ray Dose Measurements at Various Distances from the Little Boy Replica.
C. J. Huntzinger, and D. E. Hankins. Aug 84, 20p
UCRL-90177, CONF-840627-12
Contract W-7405-ENG-48
29. annual meeting of the Health Physics Society, New Orleans, LA, USA, 3 Jun 1984.

We measured neutron and gamma-ray dose rates at various distances from the Little Boy-Comet Critical Assembly at Los Alamos National Laboratory (LANL) in April of 1983. The Little Boy-Comet Assembly is a replica of the atomic weapon detonated over Hiroshima, designed to be operated at various steady-state power levels. The selected distances for measurement ranged from 107 m to 567 m. Gamma-ray measurements were made with a Reuter-Stokes environmental ionization chamber which has a sensitivity of 1.0 mu R/hour. Neutron measurements were made with a pulsed-source remmeter which has a sensitivity of 0.1 mu rem/hour, designed and built at Lawrence Livermore National Laboratory (LLNL). 12 references, 7 figures, 6 tables. (ERA citation 10:003238)

15G. Operations, Strategy, and Tactics

515,268
AD-A148 898/0/GAR PC **A02/MF A01**
Air Force Wright Aeronautical Labs., Wright-Patterson AFB, OH.
Combat Battle Damage Assessor Expert System,
D. E. Nelson. May 84, 8p SBI-AD-F650 094

Weapons to defend against aircraft are more powerful and accurate than ever. Aircraft systems and structures have become more complicated since World War II. With all these technological improvements, a war could be won or lost within the first few hours or days of battle. Therefore it is necessary that as many aircraft as possible be available for each mission. But, with new materials and manufacturing methods, the battle damage assessor is ill equipped to do his job, that of assessment and repair. Repairs which restore full strength and life to a structure are inappropriate. This paper presents a battle damage assessor expert system. The system is designed to provide the expertise of a structural engineering consultant to the damage assessor technician. (Author)

515,269
AD-A148 948/3/GAR PC **A02/MF A01**
Army War Coll., Carlisle Barracks, PA.
AirLand Battle Execution -- Some Implications of Deep Attack.
Student essay,
W. E. Olson. May 84, 22p

The Army and Air Force have committed to the concept of AirLand Battle. A cornerstone of this new doctrine is the attack of enemy second echelon units deep in his rear. The Department of Defense and Congress have shown interest in pursuing a deep attack strategy and are directing the services to get on with hardware solutions. As of this date, neither service has constructed firm requirements that will cause development programs to begin. The concept of deep attack carries with it major resource and strategy implications. The services must carefully examine the deep attack option and select the best course of action for the future. There exist many constraints which will dictate whether or not deep attack can be translated from doctrine into effective hardware that is appropriate for the AirLand Battle. Until the services complete an in-depth evaluation of both their requirements and these constraints, develop realistic needs and weigh the cost-effectiveness of proposed systems, no commitment to a hardware solution that requires significant investment should be made. It remains to be seen if the services can agree on solutions that will make deep attack a reality.

515,270
AD-A148 966/5/GAR PC **A03/MF A01**
Army War Coll., Carlisle Barracks, PA.
USAWC (United States Army War College) Military Studies Program Paper. Rear Area Protection at Corps and Division. Is It Enough.
Student essay,
O. F. McLemore. 10 May 84, 34p

The basic question is whether or not the present equipment and training provided to combat service support (CSS) units in division and corps rear areas are capable of defeating the Soviet rear threat in any future battle. Ongoing rear area protection (RAP) doctrinal and equipment changes are reviewed in detail together with an analysis of the US Army's historical record of implementing needed changes in RAP capability. A critical assessment is made of the growing Soviet multifaceted threat to the division and corps rear areas. An extensive examination is made of the division and corps CSS units' ability to defeat or delay the Soviet threat in any future conflict. The conclusion is presented that Army CSS units are receiving neither the necessary equipment nor training to cope with the threat as outlined. Recommendations are made in both equipment and training to insure CSS unit survivability in any future conflict against Soviet threat capabilities.

515,271
AD-A149 030/9/GAR PC **A06/MF A01**
Army War Coll., Carlisle Barracks, PA.
Explaining the Bay of Pigs and Vietnam, 1965 Decisions.
Study project,
F. P. Keough. 5 Jun 84, 104p

The alternative conceptual frameworks for analyzing governmental behavior developed by Graham T. Allison in his book, Essence of Division, Explaining the Cuban Missile Crisis, are applied to the questions of why the Bay of Pigs operation of 1961 was approved by President John F. Kennedy, and why President Lyndon B. Johnson committed US combat forces to Vietnam in July 1965. The decisions are examined for two reasons. First, the paper attempts to determine if the frameworks or models produce different explanations of why the decisions were made and the value of the models in the governmental decisionmaking process. Secondly, the role of the US Joint Chiefs of Staff in those decisions is highlighted to provide examples of how national-level policy decisions are translated into military plans and operations. The study indicates the models are useful in the decisionmaking process; suggests that behavioral aspects have considerable impact on the process; and the models can assist in implementing decisions.

515,272
AD-A149 067/1/GAR PC **A06/MF A01**
Army Military Personnel Center, Alexandria, VA.
Defending the Frontier: A Study of the U.S. Army in the Defense of the Nebraska Frontier in the Years 1849-1853.
Final rept.,
C. G. Clark. 12 Dec 84, 104p
Original contains color plates: All DTIC reproductions will be in black and white.

This thesis places particular emphasis on the defense of the Great Platte River Road in Nebraska during 1849 - 1853. Those areas examined include: a look at the land - Nebraska; a study of the Indians inhabiting Nebraska during these years; and a brief look at the emigrants who crossed the Nebraska frontier. The general condition of the U.S. Army in the aftermath of the Mexican War is also examined, along with a study of the Army in Nebraska during this time. The author concludes: First, the danger of Indian hostility against White emigration in Nebraska was greatly exaggerated. There was no danger to the immigrant of Indian attack during this period. Second, the U.S. Army went into the Nebraska frontier to counter a perceived Indian threat that never materialized. This forced the Army to change its mission from one of area defense to one of humanitarian relief along the Great Platte River Road in Nebraska. Third, although the danger of Indian induced hostility did not exist in 1849 - 1853, hostility was inevitable between the Whites and Plains Indians of Nebraska, because of the destruction of the White emigrants caused to the Indians' ecological basis of existence. Conflict between the Whites and the Indians was to be only a matter of time.

16.

MISSILE TECHNOLOGY

16A. Missile Launching and Ground Support

515,273
AD-A148 996/2/GAR PC **A23/MF A01**
Range Commanders Council, White Sands Missile Range, NM. Data Reduction and Computing Working Group.
Directory of Range Data Conversion and Processing Systems.
Oct 84, 540p Rept no. DR/CG-157-84
Supersedes Rept. no. DR/CG-157-80, AD-A083 495.

Contents: Directory of Range Data Conversion and Processing Systems; Pre/Post Flight and Real-Time Computer Systems; Film Readers; Frequency and Wave Analysis System; Data Transmission Systems; Printers and Plotters; Range Instrumentation Computer Systems; Telemetry Front End Systems; Terminals and Graphic Displays; and Micrographics Equipment.

16C. Missile Warheads and Fuses

515,274
AD-P004 339/8/GAR PC **A02/MF A01**
Naval Weapons Center, China Lake, CA.
Calculation through Fault Tree Analysis of the Probability of a Warhead Being Armed Prior to Launch,
G. Stefan, and F. Spille. Jun 84, 7p
This article is from 'JANNAF Propulsion Systems Hazards Subcommittee Meeting (1984) Held at Army Ballistic Research Laboratory, Aberdeen Proving Ground, Maryland on 18-20 June 1984. Volume 1,' AD-A148 865, P1-7.
Availability: Chemical Propulsion Information Agency, Johns Hopkins Road, Laurel, MD 20707 (No copies furnished by DTIC/NTIS).

This paper is presented to illustrate the usefulness of Fault Tree Analysis (FTA), which, when quantified can yield the probability of occurrence of a given undesired event. A Fault Tree is a symbolic logic diagram which provides the deductive analytical means to identify failure modes contributing to the occurrence of the undesired event. As an illustrative example, an analysis was performed to assess the design safety of the MK 76 MOD 0 Safety-Arming (S-A) device, which is used on Standard Missile SM-1 Block VI. This analysis was performed with the primary intent of determining the various scenarios leading to an armed prior to launch event. These scenarios are made possible only by the assumed failure, or assumed bypassing, of the safety interlocks in the S-A device.

16D. Missiles

515,275
AD-P004 342/2/GAR PC **A02/MF A01**
Hercules, Inc., Magna, UT. Bacchus Works.
Preventing Explosive Propagation in Racks or Containers of Tactical Missiles,
R. B. Leining. Jun 84, 10p
This article is from 'JANNAF Propulsion Systems Hazards Subcommittee Meeting (1984) Held at Army Ballistic Research Laboratory, Aberdeen Proving Ground,

Maryland on 18-20 June 1984. Volume 1,' AD-A148 865, P27-36.
Availability: Chemical Propulsion Information Agency, Johns Hopkins Road, Laurel, MD 20707 (No copies furnished by DTIC/NTIS).

In racks or containers of tactical missiles, it is sometimes impractical to observe safe separations between adjacent missiles. The current expedient of alternating the directions of adjacent missiles to place their warheads radially out of line would fail if Class 1.1 rocket motors were introduced. Installing attenuators of blast and fragments between adjacent missiles could prevent propagation in the event of an explosive mishap. Conceptual designs are presented that could be retrofitted in some existing racks or containers. Weight of packaging per missile will increase significantly. This paper suggests some ways to reduce weight. (Author)

515,276
N85-12925/2/GAR PC **A03/MF A01**
Societe Nationale Industrielle Aerospatiale, Paris (France).
Technologies des Missiles Tactiques: Recherches et Perspectives d'Avenir (Tactical Missiles Technologies. Research and Prospectives).
M. Berger. 1984, 26p SNIAS-841-320-101
In French; English Summary.

The evolution of Missile technology up to the year 2000 is discussed. Propulsion, computerized simulation, guidance, construction materials, military payloads, electromagnetic and optoelectronic sensors, inertial sensors, and data processing are considered.

515,277
PB85-140911/GAR PC **E04/MF E04**
Association Aeronautique et Astronautique de France, Paris.
Etudes Aerodynamiques Liees au Developpement des Divergents Deployables (Aerodynamic Studies of Deployment Devices),
A. Venables, and G. Laruelle. Nov 84, 68p AAAF-NT-84-18
Text in French.

The performance of certain limied-length missiles can be improved by using deployment devices in their upper stages. They occupy minimal space when folded in the storage position, while actuators ensure deployment after separation of the lower stage. For best overall results, the mass of the deployment device and its associated motorization must be reduced to a minimum. It is therefore necessary to acquire a thorough understanding of the stress factors to which they are subject, especially during the deployment phase. For several years, ONERA has been cooperating with Government Agencies and with manufacturers in studying the aerodynamics of these devices. Various methods have been used to calculate the stress on them, according to their composition (panels or rings) and their deployment phase. These methods will be presented after a detailed description of the different forms being considered.

17.

NAVIGATION, COMMUNICATIONS, DETECTION, AND COUNTERMEASURES

17A. Acoustic Detection

515,278
AD-A148 999/6/GAR PC **A02/MF A01**
Scripps Institution of Oceanography, La Jolla, CA. Marine Physical Lab.
Surface Projections of Array Beam Patterns.
Summary rept.,
W. S. Hodgkiss. Apr 84, 4p Rept no. MPL-U-66/83
Pub. in IEEE Jnl. of Oceanic Engineering, vOE-9 n2 p98 Apr 84.

No abstract available.

515,279
AD-A149 056/4/GAR PC **A02/MF A01**
Weapons Systems Research Lab., Adelaide (Australia).
Measurement of the Depth of a Sonar Array.
Technical memo.,
G. M. Collins, and A. P. Clarke. May 84, 19p Rept no. WSRL-0360-TM

The measurement of the depth of a sonar array using a modified counting technique for the demodulation and decoding of frequency modulated instrumentation signals is presented. A data dependent overflowing counter feeds demodulated data into a Programmable Read Only Memory based lookup table. Controlled, repeated counter overflows maximise the information content of the data. The system resolution is thus considerably increased with no effect on accuracy or component count. Frequency discriminating circuits are superfluous with this technique. Originator-supplied keywords include: Depth finding, and Pressure sensors.

17B. Communication

515,280
AD-A148 853/5/GAR PC **A07/MF A01**
Naval Postgraduate School, Monterey, CA.
Air-Land Battle Interdiction Model Corps Communications Module.
Master's thesis,
D. R. Alexander. Jun 84, 130p

This thesis provides the detailed concepts and methodology required to simulate the Corps Communications Module (CM) portion of the Air-Land Interdiction Model. The Communications Module is a closed architecture with rule-based decision making, network design, threat play, and net congestion that closely simulates the environment U.S. Army communications systems face in supporting Corps and selected Theater level units in Europe. The common decision making thread is the Communications Generalized Value System (CGVS) which determines current assets value based on past, present, and future usage. The CGVS provides a basis for quantitative and qualitative decision making that can be studied for cause and effect relationships by means of audit trails. The Communications Module analyzes Corps communications in high resolution detail while dealing with the problems of friendly net congestion compounded by enemy interdiction. When operational, the Communications Module will give U.S. Army communicators a realistic training and architectural planning tool.

515,281
AD-A148 957/4/GAR PC **A04/MF A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH.
Impact of the AT and T (American Telephone and Telegraph) Divestiture on the Strategic Air Command.
Master's thesis,
A. E. Paulson. 1984, 74p Rept no. AFIT/CI/NR-84-78T

This thesis describes the use of commercial telecommunications services by the Strategic Air Command (SAC), how these communications services are procured, the effect of various legal and regulatory actions on these services, and how SAC can adapt to these actions. SAC relies on services supplied by common carriers and telecommunications equipment vendors for a large portion of its command and control systems. The deregulation of the telecommunications industry, the breakup of AT&T, and increased competition has led to confusion, increased leadtimes, and higher costs. However, these effects can be mitigated if SAC places less reliance on AT&T, and begins to develop internal capabilities to manage its networks and to work with multiple vendors.

515,282
AD-A149 017/6/GAR PC **A05/MF A01**
Army Electronic Proving Ground, Fort Huachuca, AZ.
Real-Time Message Process Simulation Capability.
Final methodology investigation rept.,
R. G. Jacques. May 84, 81p

The Real-Time Message Process Simulation Capability methodology investigation was initiated to develop a method for simulating, in real-time, the responses of controlled resources in testing C3I systems. The methodolody investigation reviewed the design of the Interim Test Item Stimulator, a digital messsage test driver. Real-time process requirements were described for both MCS and TACFIRE to provide input to the real-time requirements of the Test Item Stimulator. (Author)

515,283
N85-12905/4/GAR PC **A03/MF A01**
Jet Propulsion Lab., Pasadena, CA.
Mission Science Value-Cost Savings from the Advanced Imaging Communication System (AICS) (Advanced Imaging Communication System).
R. F. Rice. 15 Jul 84, 38p NAS 1.26:174170, JPL-PUB-84-33, NASA-CR-174170
Contract NAS7-918

An Advanced Imaging Communication System (AICS) was proposed in the mid-1970s as an alternative to the Voyager data/communication system architecture. The AICS achieved virtually error free communication with little loss in the downlink data rate by concatenating a powerful Reed-Solomon block code with the Voyager convolutionally coded, Viterbi decoded downlink channel. The clean channel allowed AICS sophisticated adaptive data compression techniques. Both Voyager and the Galileo mission have implemented AICS components, and the concatenated channel itself is heading for international standardization. An analysis that assigns a dollar value/cost savings to AICS mission performance gains is presented. A conservative value or savings of $3 million for Voyager, $4.5 million for Galileo, and as much as $7 to 9.5 million per mission for future projects such as the proposed Mariner Mar 2 series is shown.

515,284
N85-13139/9/GAR PC **A02/MF A01**
National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
Fiber Optic Data Bus Using Frequency Division Multiplexing (FDM) (Frequency Division Multiplexing) and an Asymmetric Coupler.
M. Zanger, and L. Webster. Oct 84, 15p NAS 1.15:86015, A-9870, NASA-TM-86015

A fiber optic data bus, using frequency division multiplexing (FDM) is discussed. The use of FDM is motivated by the need to avoid central control of the bus operation. A major difficulty of such a data bus is introduced by the couplers. An efficient low loss access coupler with an asymmetric structure is presented, and manufacturing processes for the coupler are proposed.

515,285
N85-13146/4/GAR PC **A02/MF A01**
France Cables sous Marine et de Radio, Paris.
Transmission de la Television en Modulation de Frequence (Television Transmission in Frequency Modulation).
1984, 16p
Text in French.

The signal to noise ratios in frequency modulated television signals transmitted by a satellite are discussed. The parameters of the classical frequency modulation equations are defined. The noise characteristics are studied as a function of the available HF band and the noise to carrier power ratio. The results for the case of INTELSAT with 4.2 and 6 MHz video signals are presented. The threshold of the sound demodulation in the case of double frequency modulation is also discussed and the numerical results for INTELSAT are given.

515,286
N85-13147/2/GAR PC **A02/MF A01**
France Cables sous Marine et de Radio, Paris.
Systeme de Telecommunications Par Satellite Telecom 1 (The Telecom 1 Satellite Telecommunication System).
1984, 13p
Text in French.

System characteristics are summarized to provide a reference guide for the users of the Telecom 1 system. Services, vehicles, stations, launching facilities, industrial organization, technical characteristics, mission characteristics, packet switching parameters and time division multiple access characteristics are described.

515,287
N85-13148/0/GAR PC **A03**/MF **A01**
France Cables sous Marine et de Radio, Paris.
Methodology for the Implementation of a Domestic Satellite Communications Network.
12 Jul 84, 46p

Satellite communication network project organization, task sequencing and a typical schedule are presented. The project is divided into feasibility study, system definition, and system implementation. The basic data include traffic estimates, present national network status, master plan, available space segment characteristics, satellite transmission state of the art and environmental conditions of future Earth stations.

515,288
N85-13149/8/GAR PC **A04**/MF **A01**
European Space Agency, Paris (France).
Carrier Acquisition and Tracking by a COSTAS Loop with Automatic Frequency Control.
E. Messerschmid. Apr 84, 59p ESA-TT-838, DFVLR-FB-83-24
Transl. into English of "Akquisitions-U. Trackingverhalten Einer Costas-Regelschleif MIT Automatischer Frequenzregelung" Dfvlr-FB-83-24, Dfvlr, Oberpfaffenhofen, West Ger., Oct. 1983. Report previously announced as N84-17202.

Signal reconstruction for demodulation from the BPSK-modulated suppressed carrier by COSTAS demodulation is discussed. For heavily faded mobile communications such as satellite-aided mobile communication, carrier acquisition lasts too long for most applications, and for a large frequency uncertainty range, false carrier locking leads to an erroneous demodulation. Both disadvantages can be avoided by an automatic frequency control (AFC) inserted into the COSTAS loop. The AFC characteristics for BPSK-modulated NRZ signals, and the corresponding acquisition times, are derived for passive low pass filters. The signal tracking of the composite COSTAS/AFC loop is analyzed.

515,289
N85-13150/6/GAR PC **A03**/MF **A01**
European Space Agency, Paris (France).
Apollo System Requirements Specification.
B. Battrick. Aug 84, 38p ESA-SP-1068, EUR-9413-EN

The APOLLO electronic document delivery system general requirements (encryption, monitoring, data communication protocols, interfaces) and satellite communication system requirements (information rate, channel quality, traffic unit, number of simultaneously active ground stations, satellite access time, data message structure, size and retransmission) are outlined. System elements, the satellite network, protocol-dependent message exchanges, and data-station interface requirements are described. The maintenance alarm concept is introduced.

515,290
N85-13151/4/GAR PC **A07**/MF **A01**
European Space Research and Technology Centre, Noordwijk (Netherlands).
Transmission Analysis for the Use of 2-4 PSK (Phase Shift Keying) Modulation in Satellite Broadcasting.
R. A. Harris, L. Erup, and P. Kristiansen. Aug 84, 130p ESA-STM-231

Computer simulation studies of differentially coherent and coherent demodulation of 2-4 PSK for direct satellite broadcasting are described. The simulation models include multiple-filtering and nonlinear amplification, but do not take into account synchronization of the burst-mode digital sound interleaved with the analog video signal. Low performance degradations are obtained for coherent and differentially coherent demodulation, when simple (Butterworth and Gaussian) receiver filter types are used. The optimum receiver filter bandwidth depends on the type of filter and the type of demodulator. Adjacent-channel interference; the effects of linear gain and group-delay distortions; and carrier frequency errors at the input to the differentially coherent demodulator are discussed.

515,291
N85-13152/2/GAR PC **A03**/MF **A01**
Foersvarets Forskningsanstalt, Stockholm (Sweden).
Digital Radio Link: Wave Propagation Measurements Using Narrow Band Technique.
S. Nilsson, and L. Ladell. Aug 84, 39p FOA-C-30364-E2
In Swedish; English Summary.

Measurements on a 34 M Bit, 7 GHz digital radio link with a linkhop of 56 km are described. Events with flat and frequency selective fading are presented and a method using narrow band measurements to evaluate frequency selective fading is outlined. By making narrow band (125 kHz) measurements on 3 frequencies (-10, 0, +10 MHz, relevant to a center frequency of 70 MHz), the parameters for a 2-way model of wave propagation were evaluated in terms of delay and amplitude.

515,292
PB85-140838/GAR PC **E04**/MF **E04**
Norges Tekniske Hoegskole, Trondheim. Selskapet for Industrielt og Teknisk Forskning.
Modelling, Implementation and Use of a Traffic Simulator for NPDN (Nordic Public Data Network),
L. A. Ronningen, and N. Stol. Jun 84, 31p STF44-A84167, ISBN-82-595-3661-7

A traffic simulator for the circuit switched part of the Nordic Public Data Network (DATEX) is presented. Some implementing methods and a case study are also discussed.

515,293
PB85-144830 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Field Strength Levels in Vehicles Resulting from Communications Transmitters.
Final rept.,
J. F. Shafer. Jun 84, 14p
Sponsored by National Inst. of Justice, Washington, DC.
Pub. in NIJ (National Inst. of Justice) Report-0200-83, 14p Jun 84.

The report provides the results of an exploratory study to measure the electric field strength levels inside an automobile from communications equipment (transmitters and associated antennas) typical of that likely to be operated in and around the automobile as a law enforcement vehicle, with and without the driver's door open, and with and without front-seat occupants, at frequencies representing the frequency bands of 25 to 50, 150 to 174, 400 to 512, and 806 to 866 MHz. Levels of output power are given for the data presented. Field strength levels are also given for the situation when a metallic prisoner shield or a personal transceiver is used in a vehicle, together with a mobile transceiver, in some cases. Also included are field strength measurements of speed measuring radar devices used in vehicles.

515,294
PB85-150340/GAR PC **A16**/MF **A01**
ECON, Inc., Princeton, NJ.
Windows for Innovation: A Story of Two Large-Scale Technologies,
G. A. Hazelrigg, and E. B. Roth. 1 Dec 82, 352p
ECON-82-180-1, NSF/PRA-82071
Grant NSF-PRA81-10724

In the report, two technologies, communication satellites, and light water reactors are examined to determine the technological, institutional, and economic forces that were at play during their development and implementation. These two technologies embody a wide variety of issues encountered in technology development. Both are large-scale technologies that embody many component technologies; both have profound and widespread social impacts. Communication satellites enabled extensive international communications, and have been instrumental in fostering economic development. Light water reactors have attributes which make them potentially highly beneficial to society; however, they are plagued with potential hazards of considerable magnitude, and their future is being debated in several nations. Both technologies were developed primarily under support from the U.S. government. Although both technologies initially appeared to meet civilian market demands well and promised to enjoy successful periods of implementation, the U.S. nuclear industry may not survive. On the other hand, communication satellites are being implemented at a rate that surpasses the most favorable predictions made in the 1960s.

515,295
PB85-854966/GAR PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Cellular Radio. 1975-February 1985 (Citations from the INSPEC: Information Services for the Physics and Engineering Communities Data Base).
Rept. for 1975-Feb 85.
Feb 85, 219p
Supersedes PB84-860634.

This bibliography contains citations concerning the development of cellular mobile telephone systems. Topics include design and equipment considerations, systems descriptions, and technology development reviews. Market surveys and networking aspects are also discussed. (This updated bibliography contains 289 citations, 133 of which are new entries to the previous edition.)

515,296
PB85-855138/GAR PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Private Branch Exchange (PBX). 1975-February 1985 (Citations from the INSPEC: Information Services for the Physics and Engineering Communities Data Base).
Rept. for 1975-Feb 85.
Feb 85, 185p
Supersedes PB84-861285.

This bibliography contains citations concerning a programmable, electronic, centrally controlled, time multiplexed voice channel telephone and data traffic switching system known as private branch exchange. The role of PBX in office workstations, local area networks, and intelligent and programmable switchboards is discussed. Regulations, and explanations pertaining to private telephone installations, security, line sharing, call handling, and voice storing are also presented. (This updated bibliography contains 267 citations, 74 of which are new entries to the previous edition.)

515,297
PB85-855286/GAR PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Short-wave Radio Receivers. 1975-February 1985 (Citations from the INSPEC: Information Services for the Physics and Engineering Communities Data Base).
Rept. for 1975-Feb 85.
Feb 85, 94p
Supersedes PB84-860501.

This bibliography contains citations concerning the design, development, and applications of short-wave radio receivers. Portable receivers as well as receivers designed for use in SW communication (that is, amateur radio) are presented. Other citations consider various state-of-the-art and commercially available receivers. (This updated bibliography contains 137 citations, 13 of which are new entries to the previous edition.)

17E. Infrared and Ultraviolet Detection

515,298
AD-A149 048/1/GAR PC **A02**/MF **A01**
Naval Research Lab., Washington, DC.
Elimination of Sensor Artifacts from Infrared Data.
Interim rept.,
R. Steinberg. 11 Dec 84, 21p Rept no. NRL-8861

The objective of the Navy Background Measurements and Analysis Program (BMAP) is to satisfy the data requirements for design of surface, and air-based infrared (IR) search and track devices. The IR backgrounds data are acquired with a sensor that has high spatial resolution, high sensitivity, and simultaneous 4 to 5 micron/8 to 11 micron capability. Laboratory test show that the 8 to 11 micron detector array has an undesired ground resistance that introduces weak electrical resistive coupling among the detector channels, giving rise to spatial defects in the long-wave data. Tech-

niques are developed for inverting the focal plane resistive network, effectively decoupling the detector channels and eliminating the spatial artifacts, without smoothing the data or degrading noise performance. Originator-supplied keywords include: Data correction.

515,299
AD-A149 086/1/GAR PC **A06/MF A01**
Materials Research Labs., Ascot Vale (Australia).
Extracts from Symposium Countersurveillance '83 Held at Melbourne, Australia on 27 and 28 April, 1983.
May 84, 117p Rept no. MRL-R-921

This volume contains the text of unclassified papers and discussion from the Symposium on April, 1983. The four sessions were devoted to Service requirements, the surveillance threat, psychology of detection by humans and machines, and countermeasures. (Author)

17G. Navigation and Guidance

515,300
AD-A148 885/7/GAR PC **A02/MF A01**
Defence Research Establishment, Ottawa (Ontario).
Alignment Fixture for a Two-Degree-of-Freedom (TDF) Gyroscope.
Technical note,
R. G. Apps. Jun 84, 19p Rept no. DREO-TN-84-5
Abstract in French.

A description of the Honeywell GG1111 Single-Degree-Of Freedom (SDF) strapdown gyroscope alignment fixture and it's shortcomings are presented. The requirements for a new all aluminum alignment fixture for the Litton CSG-2 Two-Degree-Of-Freedom (TDF) strapdown gyroscope are discussed. A description of the new alignment fixture package is presented.

515,301
AD-A148 908/7/GAR PC **A04/MF A01**
Defence Research Establishment, Ottawa (Ontario).
Strapdown Navigation Algorithms Implemented in the Inertial and Geographic Frames.
Technical note,
D. F. Liang, and R. H. Johnson. Sep 83, 72p Rept no. DREO-TN-82-25

This Canadian report presents two strapdown navigation software processing algorithms, one implemented in the inertial frame and the other in the local-level geographic frame. The presentation includes derivation of various mechanization equations to obtain positional and navigational information from input data provided by three gyros and accelerometers. Directional cosine matrix and quaternion update procedures together with initialization schemes are also presented. In the inertial frame implementation a new exact algorithm was derived to transform inertially referenced data into geographic coordinates. Simulation results of a C-141 race-track flight profile are presented to indicate the level of performance accuracy for the above two processing algorithms. Complete listings of software programs are also presented in the Appendices. Originator-supplied keywords include: Geographical computational frame, and Inertial navigation frame.

515,302
AD-A149 051/5/GAR PC **A02/MF A01**
Aeronautical Research Labs., Melbourne (Australia).
Array Processor Utilisation in the Computation of Real-Time Images.
Technical memo.,
L. N. Lester. Aug 84, 24p Rept no. ARL-SYS-TM-73

The application of an array processor to the real time generation of aircraft images in Air Traffic Control tower simulation is described. Particular emphasis is placed upon the problems which arise in achieving efficient utilisation of the array processor. It is shown that the time required to transfer data from the host to the array processor is a serious consideration in the partitioning of the algorithm between the two processors. It is also shown that array processor execution speed is about ten times faster than a host Fortran routine, provided that the array processor code is written to maximise the number of parallel computing elements used and to minimise loop lengths by pipelining of operations. These requirements result in a considerable software development effort. A timing analysis of the resultant array processor code is also presented. Originator-supplied keywords include: Computer graphics, Real time operations, Pipelining (computers), and Image synthesis.

515,303
N85-12882/5/GAR PC **A07/MF A01**
Instituto de Pesquisas Espaciais, Sao Paulo (Brazil).
Analise E Simulacao de Um Sistema Inercial (Strapdown) de Determinacao de Atitude Auxiliado Por Estimacao Adaptativa DA Deriva (Analysis and Simulation of an Intertial System (Strapdown) for Auxiliary Attitude Determination by Adaptive Drift Estimation).
M.S. Thesis.
N. C. Cardenuto. Aug 84, 127p INPE-3257-TDL/177
In Portuguese; English Summary.

The attitude determination of space vehicles equiped with aided inertial systems, such as strapdown, consists basically of: (1) propegation of attitude utilizing measures of inertial sensors, (2) periodical reinitialization of the attitude and parameters of calibration of the inertial sensors, through the use of non-inertial sensors and respective attitude determination procedures. Starting from the analysis and simulation of systems like this for satellite use, a procedure for attitude estimation of the calibration parameters (measurement errors in gyros) is implemented and tested. A stochastic model for attitude propegation is adopted and the extended Kalman filter is used with an adaptive procedure for estimation of the noise in the state, in a scheme of direct filtering whose frequency is slightly less than that of propagation. The results obtained by digital simulation constitute a preliminary qualification of the procedure for the case of attitude determination of artificial satellites.

515,304
N85-12900/5/GAR PC **A07/MF A01**
Information and Control Systems, Inc., Hampton, VA.
Flight Tests of the Digital Integrated Automatic Landing System (Dials).
Final Report.
N. Halyo. Dec 84, 127p NAS 1.26:3859, TR-683106, NASA-CR-3859
Contract NAS1-16158

The design, development, implementation and flight tests of the Digital Integrated Automatic Landing System (DIALS) are discussed. The system was implemented and flight tested on the Transport Systems Research Vehicle (TSRV), a Boeing 737-100. The design uses modern optimal control methods. The direct digital design obtained uses a 10 Hz rate for the sampling of sensors and the control commands. The basic structure of the control law consists of a steady state Kalman filter followed by a control gain matrix. The sensor information used includes Microwave Landing System (MLS) position, attitude, calibrated airspeed, and body accelerations. The phases of the final approach considered are localized and steep glideslope capture (which may be performed simultaneously or independently), localizer and glideslope track, crab/decrab, and flare to touchdown. The system can capture, track, and flare from conventional, as well as steep, glideslopes ranging from 2.5 deg to 5.5 deg. All of the modes of the control law including the Kalman filters were implemented on the TSRV flight computers which use fixed point arithmetic with 16 bit words. The implementation considerations are described as well as an analysis of the flight test results.

515,305
PAT-APPL-6-666 784/GAR PC **A02/MF A01**
Department of the Air Force, Washington, DC.
Transdigitizer for Relaying Signals from Global Positioning System (GPS) Satellites.
Patent Application,
E. E. Westerfield. Filed 31 Oct 84, 25p AD-D011 442/1
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The reception, downconversion and retransmission of the 1575.42 MH2 Global Positioning System (GPS) satellite signal is accomplished by the following. First, an RF stage comprising of an antenna, filter and preamplifier receiver, filters and amplifies the 1575.42 MHz signals. Following the RF stage, a converter stage, consisting of a bandpass filter, converts the GPS signal to a lower frequency. Then, an Intermediate Frequency (IF), comprising an IF amplifier, multiplier, bandpass filter and limiter further amplifies and filters the signals to remove the effects of the signals. A final downconverter converts the signal to a base band frequency and in a zero crossing detector the signal to a base band frequency and in a zero crossing detector the signal is amplified and 1 bit quantized. Finally, a local oscillator controls a frequency synthesizer to latch the signal from the zero crossing detector in a flip flop, which in turn is used to control a quadraphase monitor, whose signals are amplified and transmitted out the transmit antenna. (Author)

515,306
PB85-151710 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Separating the Variances of Noise Components in the Global Positioning System.
Final rept.,
D. W. Allan, and M. Weiss. 1983, 16p
Pub. in Proceedings of the Annual Precise Time and Time Interval (PTTI) Applications and Planning Meeting, Washington, DC., December 6-8, 1983, p115-131.

Central to the success of the GPS program is the ability to model the frequency stability characteristics of its various components. A persistent challenge in evaluating the Global Positioning System is the separation of the errors of the satellite clocks from those due to the satellite ephemeris errors and/or the signal propagation delay errors. This information is important when one tries to improve the performance of the Global Positioning System. It is necessary to know if a particular component of the system meets specification and which component(s) limits performance. Although one cannot separate the errors themselves, a method has been developed whereby the 'Allan Variances' of critical components to the GPS can be separated. Using a reference clock such as UTC(NBS) or UTC(USNO), for example, the fractional frequency stability of each of the following can be separated from each of the others: the reference clock, the space vehicle clock, the GPS clock, the clock upload correction, the ephemeris and the propagation delay. This technique has the potential to significantly assist in properly setting the parameters to obtain optimum performance from the Global Positioning System e.g. setting the Kalman filter parameters. Results will be given showing some interesting surprises in the characteristics of the system.

17I. Radar Detection

515,307
AD-A148 922/8/GAR MF **A01**
Massachusetts Inst. of Tech., Cambridge. Lab. for Information and Decision Systems.
Multi Target Tracking by Dynamic Scene Analysis,
T. Kronhamn. Aug 84, 8p Rept no. LIDS-P-1397
Contract N00014-77-C-0532
Availability: Microfiche copies only.

An analysis is made per scan of the received returns based on their geometric interrelations only. From this, a large scale view of the tracking and the data received can be taken. Ultimately the ability of the human observer in identifying target formations, specific ECM patterns etc. would be desirable. However, a first step is taken with the objective to make feasible the initiation and tracking of large groups of targets. The analysis algorithm developed has the unique feature of defining a hierarcy of groups. This is the key feature both for its use in identification as well as in the initiation and tracking processes as described below. The method sets no limit on formation size and the track initiation phase is handled with the same ease as tracking as demonstrated in the example. The method is believed to be a goodbasis for multitarget tracking even in a more realistic radar environment and with other kinds of target behavior. The paper presented a radar scene analysis algorithm. It was shown to easily cope with track initiation of a large formation of aircrafts, a problem giving previous methods big problems. The method is believed to be a general multitarget tracking tool but further work must be done to include a more realistic radar environment and other kinds of target behavior.

515,308
PAT-APPL-6-666 841/GAR PC **A03/MF A01**

Department of the Air Force, Washington, DC.
Bistatic Coherent Radar Receiving System.
Patent Application,
L. C. Yamano. Filed 31 Oct 84, 30p AD-D011 447/0
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A coherent-on-receive MTI radar receiver system for use with cooperative or non-cooperative radar transmitters of either the coherent or noncoherent, simple magnatron type and scanning antennas. The receiver includes coherent digital signal processing with provision for normalizing or compensating phase variations in the transmitter carrier pulses. (Author)

18. NUCLEAR SCIENCE AND TECHNOLOGY

18A. Fusion Devices (Thermonuclear)

515,309
DE84016813/GAR PC **A02**/MF **A01**
Los Alamos National Lab., NM.
Toroidal Fusion Core Experiment (TFCX) Studies.
J. L. Anderson, and J. D. Rogers. 1984, 20p LA-UR-84-2585, CONF-840910-12
Contract W-7405-ENG-36
10. international conference on plasma physics and controlled nuclear fusion research, London, UK, 12 Sep 1984.
Portions are illegible in microfiche products.

Design studies have been carried out over the last several years to establish the characteristics of the options available for the next large step in the USA tokamak program. This device is called the Tokamak Fusion Core Experiment (TFCX) and the design studies have been carried out by a design team with representation from almost all elements of the USA fusion program. A review of these studies is given. (ERA citation 10:004061)

515,310
DE84017063/GAR PC **A05**/MF **A01**
Princeton Univ., NJ. Plasma Physics Lab.
Safety Assessment for the RF Test Facility.
A. Nagy, and F. Beane. Aug 84, 94p PPPL-2129
Contract AC02-76CH03073
Portions are illegible in microfiche products. Original copy available until stock is exhausted.

The Radio Frequency Test Facility (RFTF) is a part of the Magnetic Fusion Program's rf Heating Experiments. The goal of the Magnetic Fusion Program (MFP) is to develop and demonstrate the practical application of fusion. RFTF is an experimental device which will provide an essential link in the research effort aiming at the realization of fusion power. This report was compiled as a summary of the analysis done to ensure the safe operation of RFTF. (ERA citation 10:004070)

515,311
DE84017287/GAR PC **A20**/MF **A01**
Lawrence Livermore National Lab., CA.
Laser Program Annual Report 1983.
C. D. Hendricks, M. L. Rufer, and P. W. Murphy. Jun 84, 466p UCRL-50021-83
Contract W-7405-ENG-48
Portions are illegible in microfiche products. Original copy available until stock is exhausted.

In the 1983 Laser Program Annual Report we present the accomplishments and unclassified activities of the Laser Program at Lawrence Livermore National laboratory (LLNL) for the year 1983. It should be noted that the report, of necessity, is a summary, and more detailed expositions of the research can be found in the many publications and reports authored by staff members in the Laser Program. The purpose of this report is to present our work in a brief form, but with sufficient depth to provide an overview of the analytical and experimental aspects of the LLNL Inertial-Confinement Fusion (ICF) Program. The format of this report is basically the same as that of previous years. Section 1 is an overview and highlights the important accomplishments and directions of the Program. Sections 2 through 7 provide the detailed information on the various major parts of the Program: Laser Systems and Operations, Target Design, Target Fabrication, Fusion Experiments, Laser Research and Development, and Energy Applications. (ERA citation 10:004076)

515,312
DE85000437/GAR PC **A03**/MF **A01**
Rensselaer Polytechnic Inst., Troy, NY. Dept. of Nuclear Engineering.
Integrated-Blanket-Coil (IBC) Concept Applied to the Poloidal Field and Blanket Systems of a Tokamak Reactor.
D. Steiner, R. C. Block, and B. K. Malaviya. 1983, 37p DOE/ER/53163-1
Contract AC02-83ER53163
Portions are illegible in microfiche products.

A novel concept is proposed for combining the blanket and coil functions of a fusion reactor into a single component. This concept, designated the integrated-blanket-coil (IBC) concept, is applied to the poloidal field and blanket systems of a Tokamak reactor. An examination of resistive power losses in the IBC suggests that these losses can be limited to less than or equal to 10% of the fusion thermal power. By assuming a sandwich construction for the IBC walls, MHD-induced pressure drops and associated pressure stresses are shown to be modest and well below design limits. For the stainless steel reference case examined in this paper, the MHD-induced pressure drop was estimated to be approx. 1/3 MPa and the associated primary membrane stress was estimated to be approx. 47 MPa. The preliminary analyses presented in this paper indicate that the IBC concept offers promise as a means for making fusion reactors more compact by combining blanket and coils functions in a single component. (ERA citation 10:001609)

515,313
DE85000448/GAR PC **A06**/MF **A01**
Oak Ridge National Lab., TN.
Tokamak Fusion Core Experiment: Design Studies Based on Superconducting and Hybrid Toroidal Field Coils. Design Overview.
C. A. Flanagan. Oct 84, 103p ORNL/FEDC-84/3
Contract AC05-84OR21400
Portions are illegible in microfiche products. Original copy available until stock is exhausted.

This document is a design overview that describes the scoping studies and preconceptual design effort performed in FY 1983 on the Tokamak Fusion Core Experiment (TFCX) class of device. These studies focussed on devices with all-superconducting toroidal field (TF) coils and on devices with superconducting TF coils supplemented with copper TF coil inserts located in the bore of the TF coils in the shield region. Each class of device is designed to satisfy the mission of ignition and long pulse equilibrium burn. Typical design parameters are: major radius = 3.75 m, minor radius = 1.0 m, field on axis = 4.5 T, plasma current = 7.0 MA. These designs relay on lower hybrid (LHRH) current rampup and heating to ignition using ion cyclotron range of frequency (ICRF). A pumped limiter has been assumed for impurity control. The present document is a design overview; a more detailed design description is contained in a companion document. (ERA citation 10:004065)

515,314
DE85000599/GAR PC **A03**/MF **A01**
Varian Associates, Inc., Palo Alto, CA.
60 GHz Gyrotron Development Program. Quarterly Report No. 19, January-March 1984.
H. R. Jory, R. E. Bier, L. J. Craig, K. L. Felch, and L. J. Fox. 1984, 29p ORNL/Sub-79-21453/19
Contract AC05-84OR21400

The objective of this program is to develop a microwave oscillator capable of producing 200 kW of CW power at 60 GHz with high purity of the output mode. Calculations using TAPER were done for mode conversion in an improved 4-inch-diameter collector. The only remaining problem with the design is that it is slightly longer than previous CW collectors. Power density measurements were made on extended 2.5-inch-diameter collectors using small-diameter coils wound directly onto the collector to properly distribute the beam. The results were very encouraging for future CW operation of this design. Output window activity concentrated on improved surface finish, techniques of edge support and initial design of a sapphire double-disc window. (ERA citation 10:001650)

515,315
DE85000775/GAR PC **A03**/MF **A01**
Argonne National Lab., IL.
Thermal Conductivities for Sintered and Sphere-Pac Li sub 2 O and gamma exp - LiAlO sub 2 Solid Breeders with and Without Irradiation Effects.
Y. Y. Liu, and S. W. Tam. Jul 84, 40p ANL/FPP/TM-184
Contract W-31-109-ENG-38

Thermal conductivities (k, k/sub eff/) have been estimated for sintered and sphere-pac Li sub 2 O and gamma -LiAlO sub 2 with and without neutron irradiation effects. The estimation is based on (1) data from unirradiated UO sub 2 , Li sub 2 O, and gamma -LiAlO sub 2 ; (2) data from irradiated dielectric insulator materials; and (3) relatively simple physical models. Comparison of model predictions with limited ex- and in-reactor data found reasonable agreement, thus lending credence for their use in design applications. The impact of thermal conductivities on tritium breeding and power generation in fusion solid-breeder blankets is briefly highlighted. (ERA citation 10:004028)

515,316
DE85000779/GAR PC **A02**/MF **A01**
Argonne National Lab., IL.
Sputtering Performance of the TFCX Limiter.
J. N. Brooks. Sep 84, 12p ANL/FPP/TM-191
Contract W-31-109-ENG-38

The sputtering performance of the proposed TFCX pumped limiter was analyzed using the REDEP computer code. Erosion, redeposition, surface shape and heat flux changes with time, and plasma contamination issues were examined. A carbon coated limiter was found to give acceptable sputtering performance over the TFCX lifetime if, and only if, acceptable redeposition properties of carbon are obtained. (ERA citation 10:001595)

515,317
DE85000940/GAR PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Remote Handling Requirements and Considerations for D-T Fusion Reactors.
P. T. Spampinato. 1984, 19p CONF-840916-3-Dr
Contract AC05-84OR21400
Robotics and remote handling in the nuclear industry conference, Toronto, Ontario, Canada, 23 Sep 1984. Portions are illegible in microfiche products.

This paper an overview of the maintenance considerations of next-generation fusion reactors. It draws upon the work done at the Fusion Engineering Design Center over the past several years in the conceptual development of tokamaks and tandem mirrors. It specifically addresses the maintenance philosophy adopted for these devices, the configuration development using a modular design approach, scheduled and unscheduled maintenance operations, assembly and disassembly scenarios for component replacements, maintenance equipment requirements, and the operating availability of these devices. In addition, recent work on the development of a totally remote tokamak configuration is presented. (ERA citation 10:001606)

515,318
DE85000964/GAR PC **A02**/MF **A01**
General Dynamics/Convair, San Diego, CA.
Magnet Cold Mass High Load Supports Thermal Response and Performance Design Correlation.
G. R. Jones, and E. H. Christensen. Sep 84, 21p UCRL-15634
Contract W-7405-ENG-48
Portions are illegible in microfiche products.

Through General Dynamics Convair Division's experience in the design, detail analysis, and manufacturing of structural supports for superconducting magnet cryostats suspended in a vacuum enclosure, a data base, well suited for the development of correlations of pertinent thermal performance criteria for stainless

steel supports, has been created. The thermal requirements of these supports in fusion applications are well defined for the Mirror Fusion Test Facility (MFTF) and have been analyzed in detail for cool-down response and steady-state performance, using Convair's THERMAL ANALYZER computer program. From the output of these thermal conditioning simulations, correlations were developed for magnet LHe heating from supports in terms of strut geometric parameters. (ERA citation 10:004075)

515,319

DE85001038/GAR PC **A02/MF A01**
General Dynamics, San Diego, CA. Convair Div.
Vapor Cooled Lead and Stacks Thermal Performance and Design Analysis by Finite Difference Techniques.
S. D. Peck, J. M. O'Loughlin, and E. H. Christensen.
Sep 84, 18p UCRL-15635
Contract W-7405-ENG-48

Investigation of the combined thermal performance of the stacks and vapor-cooled leads for the Mirror Fusion Test Facility-B (MFTF-B) demonstrates considerable interdependency. For instance, the heat transfer to the vapor-cooled lead (VCL) from warm bus heaters, environmental enclosure, and stack is a significant additional heat load to the joule heating in the leads, proportionately higher for the lower current leads that have fewer current-carrying, counter flow coolant copper tubes. Consequently, the specific coolant flow (G/sec-kA-lead pair) increases as the lead current decreases. The definition of this interdependency and the definition of necessary thermal management has required an integrated thermal model for the entire stack/VCL assemblies. Computer simulations based on finite difference thermal analyses computed all the heat interchanges of the six different stack/VCL configurations. These computer simulations verified that the heat load of the stacks beneficially alters the lead temperature profile to provide added stability against thermal runaway. Significant energy is transferred through low density foam filler in the stack from warm ambient sources to the vapor-cooled leads. (ERA citation 10:001656)

515,320

DE85001211/GAR PC **A02/MF A01**
Lawrence Livermore National Lab., CA.
Comparison of Three ICF Reactor Designs.
W. J. Hogan. 20 Sep 84, 9p UCRL-90665, CONF-840915-7
Contract W-7405-ENG-48
13. symposium on fusion technology, Varese, Italy, 24 Sep 1984.

Three concepts for inertial confinement fusion (ICF) reactors are described and compared with each other, and with magnetic fusion and fission reactors on the basis of environmental impact, safety and efficiency. The critical technical developments of each concept are described. The three concepts represent alternative development paths for inertial fusion. (ERA citation 10:004079)

515,321

DE85001407/GAR PC **A02/MF A01**
Hanford Engineering Development Lab., Richland, WA.
Spectral Effects in FMIT (Fussion Materials Irradiation Test Facility).
D. G. Doran. May 84, 23p HEDL-7464
Contract AC06-76FF02170

The Fusion Materials Irradiation Test Facility (FMIT) is an accelerator-based source of high energy neutrons to be constructed at the Hanford Engineering Development Laboratory. It will be unique in featuring a sufficiently high flux to permit testing of fusion reactor materials at damage rates as high, or higher, than will be experienced in a commercial device. The neutron spectra in FMIT are different from those in a fusion device utilizing the D-T reaction; in particular, they include higher energy neutrons than produced in the D-T reaction. As a result, questions have been raised regarding possible difficulties in applying materials data obtained in FMIT. It is to those concerns that this note is addressed. (ERA citation 10:001611)

515,322

DE85001693/GAR PC **A03/MF A01**
Oak Ridge National Lab., TN.
Calculation of Stellarator Equilibria in Vacuum Flux Surface Coordinates.
T. C. Hender, B. A. Carreras, L. Garcia, J. A. Rome, and V. E. Lynch. Sep 84, 43p ORNL/TM-9239
Contract AC05-84OR21400
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Details are given of a three-dimensional stellarator equilibrium code NEAR. This code uses a set of vacuum flux coordinates as an Eulerian basis for the equilibrium calculations. This coordinate system provides an economic representation of the complex geometry associated with stellarators. The equilibrium equations are solved by an energy minimization technique employing a conjugate gradient iteration scheme. The results of extensive numerical convergence studies are presented. Also comparisons with existing codes are made to benchmark the NEAR code. (ERA citation 10:004066)

515,323

DE85001699/GAR PC **A02/MF A01**
Oak Ridge National Lab., TN.
Office of Basic Energy Sciences Program to Meet High Priority Nuclear Data Needs of the Office of Fusion Energy: Summary of Results 1976-1983.
D. C. Larson, and R. C. Haight. Sep 84, 11p ORNL/TM-9335
Contract AC05-84OR21400

Experimental data acquired under the BES program to meet Fusion Data Needs from its inception (1975) to 1983 are summarized by element, reaction, energy, and contributing laboratory. Cases where the data have been incorporated in ENDF evaluations are noted. Work in nuclear model code development under this program is summarized. (ERA citation 10:004068)

515,324

DE85001701/GAR PC **A18/MF A01**
Oak Ridge National Lab., TN.
Fusion Energy Division (Oak Ridge National Laboratory) Annual Progress Report Period Ending December 31, 1983.
Sep 84, 414p ORNL-6015
Contract AC05-84OR21400
Portions are illegible in microfiche products. Original copy available until stock is exhausted.

The Fusion Program carries out work in a number of areas: (1) experimental and theoretical research on two magnetic confinement concepts - the ELMO Bumpy Torus (EBT) and the tokamak, (2) theoretical and engineering studies on a third concept - the stellarator, (3) engineering and physics of present-generation fusion devices, (4) development and testing of diagnostic tools and techniques, (5) development and testing of materials for fusion devices, (6) development and testing of the essential technologies for heating and fueling fusion plasmas, (7) development and testing of the superconducting magnets that will be needed to confine these plasmas, (8) design of future devices, (9) assessment of the environmental impact of fusion energy, and (10) assembly and distribution to the fusion community of data bases on atomic physics and radiation effects. The interactions between these activities and their integration into a unified program are major factors in the success of the individual activities, and the ORNL Fusion Program strives to maintain a balance among these activities that will lead to continued growth. (ERA citation 10:004064)

515,325

DE85001727/GAR PC **A24/MF A01**
Lawrence Livermore National Lab., CA.
Mirror Advanced Reactor Study (MARS). Final Report. Volume 1-A. Commercial Fusion Electric Plant.
M. L. Donohue, and M. E. Price. Jul 84, 562p UCRL-53480-V.1A
Contract W-7405-ENG-48
Portions are illegible in microfiche products. Original copy available until stock is exhausted.

Volume 1-A contains the following chapters: (1) plasma engineering, (2) magnets, (3) ecr heating systems, (4) anchor ion-cyclotron resonance heating system, (5) sloshing ion neutral beam, (6) end cell structure, (7) end plasma technology, (8) fueling, (9) startup ion cyclotron resonant heating systems, and (10) end cell radiation analysis. (ERA citation 10:001658)

515,326

DE85001728/GAR PC **A15/MF A01**
Lawrence Livermore National Lab., CA.
Mirror Advanced Reactor Study (MARS). Final Report. Volume 2. Commercial Fusion Synfuels Plant.
M. L. Donohue, and M. E. Price. Jul 84, 343p UCRL-53480-V.2
Contract W-7405-ENG-48
Portions are illegible in microfiche products.

Volume 2 contains the following chapters: (1) synfuels; (2) physics base and parameters for TMR; (3) high-temperature two-temperature-zone blanket system for synfuel application; (4) thermochemical hydrogen processes; (5) interfacing the sulfur-iodine cycle; (6) interfacing the reactor with the thermochemical process; (7) tritium control in the blanket system; (8) the sulfur trioxide fluidized-bed composer; (9) preliminary cost estimates; and (10) fuels beyond hydrogen. (ERA citation 10:001659)

515,327

DE85001729/GAR PC **A20/MF A01**
Lawrence Livermore National Lab., CA.
Mirror Advanced Reactor Study (MARS). Final Report. Volume 1-B. Commercial Fusion Electric Plant.
M. L. Donohue, and M. E. Price. Jul 84, 463p UCRL-53480-V.1B
Contract W-7405-ENG-48
Portions are illegible in microfiche products. Original copy available until stock is exhausted.

Volume 1-B contains the following chapters: (1) blanket and reflector; (2) central cell shield; (3) central cell structure; (4) heat transport and energy conversion; (5) tritium systems; (6) cryogenics; (7) maintenance; (8) safety; (9) radioactivity, activation, and waste disposal; (10) instrumentation and control; (11) balance of plant; (12) plant startup and operation; (13) plant availability; (14) plant construction; and (15) economic analysis. (ERA citation 10:004077)

515,328

DE85001742/GAR PC **A02/MF A01**
Lawrence Livermore National Lab., CA.
Use of the ORACLE DBMS in Determining the Response of Complex Scientific Instrumentation.
J. M. Auerbach, B. J. DeMartini, and E. W. McCauley. 27 Jun 84, 8p UCRL-90636, CONF-8406113-1
Contract W-7405-ENG-48
International ORACLE user group conference, San Francisco, CA, USA, 19 Aug 1984.

In the Laser Fusion Program at Lawrence Livermore National Laboratory, a single laser fusion experiment lasts only a billionth of a second but in this time high speed instrumentation collects data that when digitized will create a data bank of several megabytes. This first level of data must be processed in several stages to put it in a form useful for interpretation of the experiments. One stage involves unfolding the source characteristics from the data and response of the instrument. This involves calculating the response of the instrument from the characteristics of each of its components. It is in this calculation that the ORACLE DBMS has become an invaluable tool for manipulation and archiving of the component data. (ERA citation 10:004078)

515,329

DE85002351/GAR PC **A18/MF A01**
Los Alamos National Lab., NM.
Compact Reversed-Field Pinch Reactors (CRFPR): Preliminary Engineering Considerations.
R. L. Hagenson, R. A. Krakowski, C. G. Bathke, R. L. Miller, and M. J. Embrechts. Aug 84, 409p LA-10200-MS
Contract W-7405-ENG-36
Portions are illegible in microfiche products. Original copy available until stock is exhausted.

The unique confinement physics of the Reversed-Field Pinch (RFP) projects to a compact, high-power-density fusion reactor that promises a significant reduction in the cost of electricity. The compact reactor also promises a factor-of-two reduction in the fraction of total cost devoted to the reactor plant equipment (i.e., fusion power core (FPC) plus support systems). In addition to operational and developmental benefits, these physically smaller systems can operate eco-

nomically over a range of total power output. After giving an extended background and rationale for the compact fusion approaches, key FPC subsystems for the Compact RFP Reactor (CRFPR) are developed, designed, and integrated for a minimum-cost, 1000-MWe(net) system. Both the problems and promise of the compact, high-power-density fusion reactor are quantitatively evaluated on the basis of this conceptual design. The material presented in this report both forms a framework for a broader, more expanded conceptual design as well as suggests directions and emphases for related research and development. (ERA citation 10:004060)

515,330
DE85002392/GAR PC **A07**/MF **A01**
National Research Council, Washington, DC. Energy Engineering Board.
Cooperation and Competition on the Path to Fusion Energy.
1984, 139p DOE/ER/54025-T1
Contract FG05-83ER54025
Portions are illegible in microfiche products.

The United States, the European Community, and Japan are actively considering whether worthwhile advantages lie in increased cooperation among their respective programs of research and development in magnetically confined fusion. To help answer that question for the United States, this report examines why cooperation is a policy option, what might be done, and how. (ERA citation 10:003910)

515,331
DE85002487/GAR PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
Joint JET ISX-B Beryllium Limiter Experiment. Monthly Newsletter, June 1984.
1984, 29p CONF-8409173-1
Contract AC05-84OR21400
Joint European Torus (JET)undertaking meeting, Abington, UK, 21 Sep 1984.

The main goal for the month of June was the characterization of neutral beam heated discharges with the beryilium limiter. The beam injection experiments were begun with 0.53 MW of beam power yielding a total of 0.7 MW with the ohmic power included. At this power level the maximum limiter load was 1.4 kW/cm exp 2 , and the surface temperature rise was about 300 degrees C. In the next step the injected power was raised to 0.83 MW so that the total heating power was about 1 MW. The plasma parameters were I/sub p/ = 116 kA, anti n/sub e/ = 4.10 exp 13 cm exp -3 , and B/sub T/ = 1.4 T. The resulting maximum heat flux on the limiters was 2.2 kW/cm exp 2 , and the corresponding surface temperature rise was 470 degrees C. These conditions came very close to the design load of 2.5 kW/cm exp 2 . At this point the plasma behavior was extensively characterized and documented in terms of density and temperature profiles, impurity content, parameter space, and limiter loads. It was found that the global plasma behavior was very similar to the reference case with the TiC-coated graphite limiters. In both cases the impurity content was dominated by oxygen and carbon, leading to the conclusion that in both cases the plasma was wall-dominated rather than limiter-dominated. (ERA citation 10:004030)

515,332
DE85002561/GAR PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Design Description of the Vacuum Vessel for the Advanced Toroidal Facility.
K. K. Chipley, B. E. Nelson, L. M. Vinyard, and D. F. Williamson. 1983, 3p CONF-831203-189
Contract AC05-84OR21400
10. symposium on fusion engineering, Philadelphia, PA, USA, 5 Dec 1983.
Portions are illegible in microfiche products.

The Advanced Toroidal Facility (ATF) will be a stellarator experiment to investigate improvements in toroidal confinement. The vacuum vessel for this facility will provide the appropriate evacuated region for plasma containment within the helical field (HF) coils. The vessel is designed to provide the maximum reasonable volume inside the HF coils and to provide the maximum reasonable access for future diagnostics. The vacuum vessel design is at an early phase and all of the details have not been completed. The heat transfer analysis and stress analysis completed during the conceptual design indicate that the vessel will not change drastically. (ERA citation 10:004029)

515,333
DE85002568/GAR PC **A02**/MF **A01**
Varian Associates, Inc., Palo Alto, CA.
Varian Gyrotron Development Program.
H. R. Jory. 1984, 16p CONF-8410175-1
Contract AC05-84OR21400
Gyrotron user/developer meeting, Gaithersburg, MD, USA, 2 Oct 1984.

A brief outline of this development program is given. (ERA citation 10:004031)

515,334
DE85002703/GAR PC **A03**/MF **A01**
Princeton Univ., NJ. Plasma Physics Lab.
PPPL Tokamak Program.
H. P. Furth. Oct 84, 36p PPPL-2149
Contract AC02-76CH03073

The economic prospects of the tokamak are reviewed briefly and found to be favorable - if the size of ignited tokamak plasmas can be kept small and appropriate auxiliary systems can be developed. The main objectives of the Princeton Plasma Physics Laboratory tokamak program are: (1) exploration of the physics of high-temperature toroidal confinement, in TFTR; (2) maximization of the tokamak beta value, in PBX; (3) development of reactor-relevant rf techniques, in PLT. (ERA citation 10:004072)

515,335
DE85002711/GAR PC **A02**/MF **A01**
Princeton Univ., NJ. Plasma Physics Lab.
Two-Chamber Model for Divertors with Plasma Recycling.
W. D. Langer, and C. E. Singer. Nov 84, 19p PPPL-2160
Contract AC02-76CH03073
Portions are illegible in microfiche products. Original copy available until stock is exhausted.

To model particle and heat loss terms at the edge of a tokamak with a divertor or pumped limiter, a simple two-chamber formulation of the scrapeoff has been constructed by integrating the fluid equations, including sources, along open field lines. The model is then solved for a wide range of density and temperature conditions in the scrapeoff, using geometrical parameters typical of the PDX poloidal divertor. The solutions characterize four divertor operating conditions for beam-heated plasmas: plugged, unplugged, blowthrough, and blowback. (ERA citation 10:004074)

515,336
DE85002714/GAR PC **A02**/MF **A01**
Princeton Univ., NJ. Plasma Physics Lab.
First-Wall and Limiter Conditioning in TFTR.
H. F. Dylla, W. R. Blanchard, R. J. Hawryluk, K. W. Hill, and R. B. Krawchuk. Oct 84, 23p PPPL-2120, CONF-840520-25
Contract AC02-76CH03073
International conference on plasma surface interactions in controlled fusion devices, Nagoya, Japan, 14 May 1984.
Portions are illegible in microfiche products. Original copy available until stock is exhausted.

A progress report on the experimental studies of vacuum vessel conditioning during the first year of TFTR operation is presented. A previous paper described the efforts expended to condition the TFTR vessel prior to and during the initial plasma start-up experiments. During the start-up phase, discharge cleaning was performed with the vessel at room temperature. For the second phase of TFTR operations, which was directed towards the optimization of ohmically heated plasmas, the vacuum vessel could be heated to 150 exp 0 C. The internal configuration of the TFTR vessel was more complex during the second phase with the addition of a TiC/C moveable limiter array, Inconel bellows cover plates, and ZrAl getter pumps. A quantitative comparison is given on the effectiveness of vessel bakeout, glow discharge cleaning, and pulse discharge cleaning in terms of the total quantity of removed carbon and oxygen, residual gas base pressures and the resulting plasma impurity levels as measured by visible, uv, and soft x-ray spectroscopy. The initial experience with hydrogen isotope changeover in TFTR is presented including the results of the attempt to hasten the changeover time by using a glow discharge to precondition the vessel with the new isotope. (ERA citation 10:004069)

18B. Isotopes

515,337
DE85000770/GAR PC **A08**/MF **A01**
Ion Physics Corp., Burlington, MA.
Design, Manufacture, Test, and Delivery of 230 KV Extruded, Radiation Cross-Linked Polyethylene Cable: Design of 7 Megavolt Toroidal Irradiator; Fabrication and Testing of Model Cables. Final Report.
Jan 84, 158p DOE/ET/29048-T1
Contract AC01-78ET29048

In June 1975 a contract was let to Reynolds Metals Company for design, manufacture, and testing of radiation crosslinked 138 and 230 kV cables. A key element was to be development of a 7 MV toroidal electron beam irradiator under subcontract. During the fall of 1977, Reynolds withdrew from manufacture of high voltage polyethylene insulated cable, causing the program to be restructured with IPC as prime contractor and Phelps Dodge Cable and Wire Company in the role of cable supplier. (ERA citation 10:002024)

515,338
DE85002002/GAR PC **A03**/MF **A01**
Lawrence Livermore National Lab., CA.
Review of AVLIS Technology for Production-Scale LIS Systems and Construction.
J. I. Davis, and E. I. Moses. Dec 83, 28p UCRL-89722, CONF-831265-7
Contract W-7405-ENG-48
International conference on lasers and applications, San Francisco, CA, USA, 12 Dec 1983.
Portions are illegible in microfiche products.

The use of lasers for uranium and/or plutonium isotope separation is expected to be the first application of lasers utilizing specific atomic processes for large-scale materials processing. Specific accomplishments toward the development of production-scale technology for LIS systems will be presented, along with the status of major construction projects. 24 figures. (ERA citation 10:000230)

515,339
DE85002347/GAR PC **A03**/MF **A01**
Los Alamos National Lab., NM.
Use of Calibration Standards and the Correction for Sample Self-Attenuation in gamma-Ray Nondestructive Assay.
J. L. Parker. Aug 84, 35p LA-10045
Contract W-7405-ENG-36
Portions are illegible in microfiche products. Original copy available until stock is exhausted.

The efficient use of appropriate calibration standards and the correction for the attenuation of the gamma rays within an assay sample by the sample itself are two important and closely related subjects in gamma-ray nondestructive assay. Much research relating to those subjects has been done in the Nuclear Safeguards Research and Development program at the Los Alamos National Laboratory since 1970. This report brings together most of the significant results of that research. Also discussed are the nature of appropriate calibration standards and the necessary conditions on the composition, size, and shape of the samples to allow accurate assays. Procedures for determining the correction for the sample self-attenuation are described at length including both general principles and several specific useful cases. The most useful concept is that knowing the linear attenuation coefficient of the sample (which can usually be determined) and the size and shape of the sample and its position relative to the detector permits the computation of the correction factor for the self-attenuation. A major objective of the report is to explain how the procedures for determining the self-attenuation correction factor can be applied so that calibration standards can be entirely appropriate without being particularly similar, either physically or chemically, to the items to be assayed. This permits minimization of the number of standards required to assay items with a wide range of size, shape, and chemical composition. 17 references, 18 figures, 2 tables. (ERA citation 10:002015)

515,340
DE85002552/GAR PC **A03**/MF **A01**
Monsanto Research Corp., Miamisburg, OH. Mound.

Mound Activities in Chemical and Physical Research: January-June 1984.
22 Oct 84, 36p MLM-3195
Contract AC04-76DP00053

Progress is reported on low temperature research (reaction rates of D sub 2 + T sub 2 mixtures; helium-4 second virial as applied to gas thermometry; low temperature trennschaukel) and separation research (liquid phase thermal diffusion, calcium isotope separation, zinc isotope separation, mutual diffusion, molecular beam scattering, zinc chemical exchange, sulfur isotope enrichment via chemical exchange). (ERA citation 10:002021)

515,341
NUREG/CR-4094/GAR PC **A04**/MF **A01**
Lamont-Doherty Geological Observatory, Palisades, NY.
Field Experiment Determinations of Distribution Coefficients of Actinide Elements in Sulfate Lake Environments.
Topical rept.,
H. J. Simpson, R. M. Trier, A. L. Herczeg, and R. F. Anderson. Jan 85, 71p

The concentrations of a number of radioisotopes of some elements (Pu, U, Th, Pa, Ac, Ra, Bi, Po, Pb, Cs, Sr, and K) were measured in a group of lakes that are dominated by SO4(-2) ion in their anionic composition. Only Pu and the Th show possible enhancement of solubility at high sulfate concentrations in some Saskatchewan lakes, although never to the extent as observed for alkaline lakes. Surface waters of Green Lake (meromictic) which are at saturation with respect to calcite have approximately the same radionuclide content as seawater. The deepwaters (anoxic) show a marked increase in Th and Ra. This indicates that these elements may be coupled with the redox cycle of Fe and Mn which under oxygenated conditions effectively sequester Pu, Th, and Ra as Fe(-1)Mn oxyhydroxides. Another possibility for the enhanced (226)Ra in the deep water is by coprecipitation with CaCO3 in the surface water and subsequent dissolution in the deep water thereby releasing radium into the water.

18C. Nuclear Explosions

515,342
AD-A148 997/0/GAR MF **A01**
Reynolds Electrical and Engineering Co., Inc., Las Vegas, NV.
Operations FLINTLOCK and LATCHKEY Events RED HOT, PIN STRIPE, DISCUS THROWER, PILE DRIVER, DOUBLE PLAY, NEWPOINT, MIDI MIST, 5 March 1966-26 June 1967.
Technical rept.,
K. K. Horton, B. F. Eubank, and W. J. Brady. 1 Oct 84, 271p DNA-6321F, SBI-AD-E301 513
Availability: Microfiche copies only.

This report is a personnel-oriented history of DOD participation in underground nuclear weapons testing during Operations FLINTLOCK and LATCHKEY, test events RED HOT, PIN STRIPE, DISCUS THROWER, PILE DRIVER, DOUBLE PLAY, NEW POINT, and MIDI MIST, from 5 March 1966 to 26 June 1967. It is the second in a series of historical reports which will include all DOD underground nuclear weapons tests and all DOE underground nuclear weapons tests with significant DOD participation from 1962 forward. In addition to these historical volumes, a later restricted distribution volume will identify all DOD participants (military, civilian, and civilian contractors) and will list their radiation dosimetry data.

515,343
DE85000166/GAR PC **A08**/MF **A01**
Zaininger Engineering Co., San Jose, CA.
Electromagnetic Pulse (EMP) Interaction with Electric Power Systems. Power Systems Technology Program. Final Report.
H. W. Zaininger. Aug 84, 164p ORNL/Sub-82-47905/1
Contract AC05-84OR21400
Portions are illegible in microfiche products. Original copy available until stock is exhausted.

A high altitude nuclear burst, detonated at a height of 50 km or more, causes two types of electromagnetic pulses (EMP) - high altitude EMP (HEMP) and magnetohydrodynamic EMP (MHD-EMP). This high altitude EMP scenario is of principal concern when assessing the effects of EMP on electric power systems, because the total United States can be simultaneously illuminated by HEMP and MHD-EMP can cover a large area of up to several hundred kilometers in diameter. The purpose of this project was first to define typical electrical power system characteristics for EMP analysis, and second, to determine reasonable worst case EMP induced surges on overhead electric power system transmission and distribution lines for reasonable assumptions, using unclassified HEMP and MHD-EMP electric field waveforms. (ERA citation 10:001138)

515,344
DE85000747/GAR PC **A03**/MF **A01**
Lawrence Livermore National Lab., CA.
Subsidence in the Craters of Nuclear Tests at the Pacific Proving Grounds.
D. E. Burton, R. P. Swift, J. B. Bryan, and H. D. Glenn. Aug 84, 37p UCRL-91583, CONF-840721-3
Contract W-7405-ENG-48
Engineering Foundation conference on compressibility phenomena in subsidence, Henniker, NH, USA, 29 Jul 1984.
Portions are illegible in microfiche products.

The craters from high-yield nuclear tests at the Pacific Proving Ground are very broad and shallow in comparison with the bowl-shaped craters formed in continental rock at the Nevada Test Site (NTS) and elsewhere. Attempts to explain the difference in terms of device yield (which was much larger in the Pacific tests than at NTS) have been generally unsatisfactory. We have for the first time successfully modeled the Koa Event, a representative coral-atoll test. On the basis of plausible assumptions about the geology and about the constitutive relations for coral, we have shown that the size and shape of the Koa crater can be accounted for by subsidence and liquefaction phenomena. If future studies confirm these assumptions, it will mean that some scaling formulas based on data from the Pacific will have to be revised to avoid overestimating weapons effects in continental geology. 41 references, 10 figures, 1 table. (ERA citation 10:003239)

515,345
N85-13154/8/GAR PC **A02**/MF **A01**
Societe Nationale Industrielle Aerospatiale, Les Mureaux (France).
Essais de Susceptibilite a Une Agression Electromagnetique (Tests for Susceptibility to Electromagnetic Attack).
C. Federici. 1984, 11p SNIAS-842-422-101
Text in French. Presented at Journees See, Grenoble, France, 9-11 May 1984.

Tests in which the required electromagnetic interference levels are directly injected in the tested circuits through, for example, magnetic coupling are described. The goal is the determination of thresholds at which the system in incapable of functioning normally. Typical test procedures and test equipment are described.

18D. Nuclear Instrumentation

515,346
DE85000677/GAR PC **A06**/MF **A01**
Search Technology, Inc., Norcross, GA.
Computer-Generated Display System Guidelines. Volume 2. Developing an Evaluation Plan.
Sep 84, 102p EPRI-NP-3701-V.2
Contract AC05-84OR21400

Volume 1 of this report provides guidance to utilities on the design of displays and the selection and retrofit of a computer-generated display system in the control room of an operating nuclear power plant. Volume 2 provides guidance on planning and managing empirical evaluation of computer-generated display systems, particularly when these displays are primary elements of computer-based operator aids. The guidance provided is in terms of a multilevel evaluation methodology that enables sequential consideration of three primary issues: (1) compatibility; (2) understandability; and (3) effectiveness. The evaluation process approaches these three issues with a top-down review of system objectives, functions, tasks, and information requirements. The process then moves bottom-up from lower-level to higher-level issues, employing different evaluation methods at each level in order to maximize the efficiency and effectiveness of the evaluation process. (ERA citation 10:002313)

515,347
DE85001206/GAR PC **A02**/MF **A01**
Lawrence Livermore National Lab., CA.
Approaches to Ultrafast Neutron Detectors.
C. L. Wang, R. Kalibjian, M. S. Singh, J. D. Wiedwald, and D. E. Campbell. 5 Oct 84, 9p UCRL-91317, CONF-840922-18
Contract W-7405-ENG-48
APS topical conference on high temperature plasma diagnostics, Tahoe City, CA, USA, 16 Sep 1984.

We discuss two approaches to obtain detectors of very high temporal resolution. In the first approach, uranium-coated cathode is used in a streak tube configuration. Secondary electrons accompanying the fission fragments from a neutron-uranium reaction are accelerated, focussed and energy analyzed through a pinhole and streaked. Calculations show that 20 ps time-resolution can be obtained. In the second approach, a uranium-coated cathode is integrated into a transmission line. State-of-the-art technology indicates that time resolution of 20 ps can be obtained by gating the cathode with a fast electric pulse. (ERA citation 10:003202)

515,348
DE85001402/GAR PC **A06**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Workshop on Detectors for Relativistic Nuclear Collisions: Proceedings.
Aug 84, 161p LBL-18225, CONF-8403137-
Contract AC03-76SF00098
Workshop on detectors for relativistic nuclear collisions, Berkeley, CA, USA, 26 Mar 1984.
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Separate abstracts were prepared for ten papers in this proceedings. Two other papers in the proceedings had been previously indexed for EDB. (ERA citation 10:001110)

515,349
DE85001523/GAR PC **A04**/MF **A01**
Los Alamos National Lab., NM.
Universal Fast Breeder Reactor Subassembly Counter Manual.
H. O. Menlove, G. W. Eccleston, J. E. Swansen, P. Goris, and R. Abedin-Zadeh. Aug 84, 51p LA-10226-M
Contract W-7405-ENG-36
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A neutron coincidence counter has been designed for the measurement of fast breeder reactor fuel assemblies. This assay system can accommodate the full range of geometries and masses found in fast breeder subassemblies under IAEA safeguards. The system's high-performance capability accommodates high plutonium loadings of up to 16 kg. This manual describes the system and its operation and gives performance and calibration parameters for typical applications. (ERA citation 10:000332)

515,350
DE85001538/GAR PC **A02**/MF **A01**
Los Alamos National Lab., NM.
Evaluation of the sup 63 Cu Activation Foil for Determining the Neutron Dose in the Energy Range of 1 EV to 1 MeV.
Y. Eisen, D. G. Vasilik, and R. J. Brake. Aug 84, 19p LA-10074-MS
Contract W-7405-ENG-36
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The appropriateness of the sup 63 Cu activation foil for determining the neutron dose in the energy region from 1 eV to 1 MeV has been investigated for spectra of seven different criticality accident configurations. A program was written for folding the published spectra with the sup 63 Cu activation cross sections and with the fluence-to-dose or kerma conversion factors. It is shown that for these spectra the neutron dose and kerma result primarily from the energy region above 15 keV whereas the measured sup 64 Cu activity is mainly determined by the fluence in the region between 1 eV and 15 keV. Uncertainties in the fluence spectrum in

the low-energy region between 1 eV and 15 keV, which in reality do not affect the dose contribution, might lead to large deviations in the measured sup 64 Cu activity and hence to the derived dose in the 1 eV to 1 MeV range. Use of sup 10 B shielding for attenuating the fluence in the 1-eV to 15-keV region was evaluated, leading to the conclusion that the necessary amount of boron material is unacceptably large and would appreciably increase the cost of the dosimeter currently used at Los Alamos. The lower limit of neutron detectability would also be increased. (ERA citation 10:003174)

515,351
DE85001651/GAR PC **A03**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
GSI-LBL Plastic Ball/Wall Spectrometer.
H. A. Gustafsson, K. G. R. Doss, H. H. Gutbrod, B. Kolb, and B. Ludewigt. Sep 84, 28p LBL-18380, CONF-841005-1
Contract AC03-76SF00098
Instrumentation for heavy ion nuclear research conference, Oak Ridge, TN, USA, 22 Oct 1984.
Portions are illegible in microfiche products.

For the high multiplicity events occurring in relativistics nuclear collisions an electronic 4 pi detector with particle identification has been built. It consists of 815 delta E - E telescopes and 176 TOF telescopes covering 97% of 4 pi . Very good particle identification has been obtained for hydrogen and helium isotopes and also pi exp + have been detected with high efficiency. This spectrometer was used at the Berkeley Bevalac to study the reactions Ca + Ca, Nb + Nb and Au + Au at energies between 0.15 and 1.05 GeV/nucleon. Various exclusive observables like the degree of thermalization, the multiplicity dependence of composite particle formation, and freeze-out densities are discussed. From global analyses the collective flow of nuclear matter has been deduced. A method of separating efficiently participant and spectator particles has been applied in order to disentangle the two collective effects: The side-splash of the participants and the bounce-off in the fragmentation region. 9 references, 11 figures. (ERA citation 10:003178)

515,352
DE85002050/GAR PC **A02**/MF **A01**
Los Alamos National Lab., NM.
Time-of-Flight Isochronous (TOFI) Spectrometer for Direct Mass Measurements of Exotic Light Nuclei.
J. M. Wouters, D. J. Vieira, G. W. Butler, and H. Wollnik. 1984, 8p LA-UR-84-3055, CONF-8409143-8
Contract W-7405-ENG-36
International conference on atomic masses and fundamental constants (AMCO-7), Darmstadt-Seeheim, F.R. Germany, 3 Sep 1984.
Portions are illegible in microfiche products.

TOFI is a new spectrometer being constructed at the Los Alamos Meson Physics Facility (LAMPF) for the expressed purpose of making direct mass measurements of low Z neutron-righ nuclei produced in proton-induced fragmentation reactions of uranium. The design of TOFI will permit systematic mass measurements for a wide range of neutron-rich nuclei below A=70 with accuracies of 30 keV to 1 MeV depending on production rates. The resulting large set of data will enable reevaluations of the various mass theories and nuclear structure investigations as well as provide a base from which to reconform previous mass measurements. This paper will present a brief review of the nuclear physics interests in the low Z neutron-rich region as well as a description of the TOFI spectrometer now under construction. (ERA citation 10:003175)

515,353
DE85002240/GAR PC **A02**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.
Interactive and Automated Systems for Nuclear Track Measurements with Applications to Fast Neutron Dosimetry.
J. H. Roberts, R. Gold, J. P. McNeece, C. C. Preston, and F. H. Ruddy. Dec 83, 13p HEDL-SA-3070-FP, CONF-840202-28
Contract AC06-76FF02170
17. midyear topical meeting of the Health Physics Society, Pasco, WA, USA, 5 Feb 1984.
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Interactive and automatic track measuring systems have been developed primarily for fast neutron dosimetry in and around reactors. The interactive system is used for proton recoil measurements in nuclear research emulsions and the automatic systems for counting fission fragment tracks in Muscovite mica. The status of these systems, along with illustrative applications, are presented, particularly with regard to their relationship to neutron personnel dosimetry. 16 references, 12 figures. (ERA citation 10:003169)

515,354
DE85002384/GAR PC **A02**/MF **A01**
Los Alamos National Lab., NM.
Use of a Commercial Ranging System in Field Surveys of Radioactively Contaminated Sites.
G. M. Worth, J. M. Crowell, A. D. Meddles, J. D. Jarrett, and M. A. Wolf. 1984, 5p LA-UR-84-3298, CONF-841007-8
Contract W-7405-ENG-36
Nuclear science symposium, Orlando, FL, USA, 31 Oct 1984.
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Now, the adaptation of a commercial ranging and tracking system interfaced to these instruments and to an advanced computer graphics system promises another major improvement to the automation of data collection. Contour maps with radiation isopleths and the x-y position of up to eight instrument operators superimposed thereon can be displayed in near real time. A bidirectional data link offers a further improvement in simulation of, and training for, field surveys since previously collected or computer simulated radiation data as a function of position can be transmitted back to the same survey instrument and displayed to the operator in a manner indistinguishable from real-time data. Additionally, simulated instrument malfunctions such as low battery, detector failure, or total failure can be commanded to occur to evaluate operator response to unusual occurrences under the stress of field conditions. This training mode will greatly improve the ability to simulate situations and to train and evaluate operations personnel while eliminating the need to use special sites and potentially hazardous contamination simulants as are used now. (ERA citation 10:003176)

515,355
DE85002409/GAR PC **A02**/MF **A01**
Los Alamos National Lab., NM.
Monte Carlo Simulation of the Sequential Probability Ratio Test for Radiation Monitoring.
K. L. Coop. 1984, 6p LA-UR-84-3380, CONF-841007-13
Contract W-7405-ENG-36
Nuclear science symposium, Orlando, FL, USA, 31 Oct 1984.

A computer program simulates the Sequential Probability Ratio Test (SPRT) using Monte Carlo techniques. The program, SEQTEST, performs random-number sampling of either a Poisson or normal distribution to simulate radiation monitoring data. The results are in terms of the detection probabilities and the average time required for a trial. The computed SPRT results can be compared with tabulated single interval test (SIT) values to determine the better statistical test for particular monitoring applications. Use of the SPRT in a hand-and-foot alpha monitor shows that the SPRT provides better detection probabilities while generally requiring less counting time. Calculations are also performed for a monitor where the SPRT is not permitted to the take longer than the single interval test. Although the performance of the SPRT is degraded by this restriction, the detection probabilities are still similar to the SIT values, and average counting times are always less than 75% of the SIT time. Some optimal conditions for use of the SPRT are described. The SPRT should be the test of choice in many radiation monitoring situations. 6 references, 8 figures, 1 table. (ERA citation 10:002018)

515,356
DE85002416/GAR PC **A02**/MF **A01**
Los Alamos National Lab., NM.
Integration of NDA Instruments into the Savannah River Plant Computer Network.
A. L. Baker, and M. P. Baker. 1984, 4p LA-UR-84-3394, CONF-841007-16
Contract W-7405-ENG-36
Nuclear science symposium, Orlando, FL, USA, 31 Oct 1984.

The Safeguards Systems Group at the Los Alamos National Laboratory is collaborating with several other national laboratories in designing an integrated, state-of-the-art nondestructive assay (NDA) system for a new facility being constructed at the Savannah River Plant. We have focused our efforts on the development of an Instrument Control Computer (ICC) that will perform interfacing and communication tasks among small computers controlling NDA instruments in the Sample Assay Room and Feed Assay Room, the host computer for the process control system, and an existing nuclear materials accounting computer. Solution sample scheduling, feed-material sample verification, and other ICC functions will be described in detail. 4 references, 5 figures. (ERA citation 10:002020)

515,357
DE85002472/GAR PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Large Acceptance Spectrometers for pi exp 0 Mesons.
T. C. Awes, R. L. Ferguson, F. E. Obenshain, F. Plasil, and G. R. Young. 1984, 7p CONF-841005-2
Contract AC05-84OR21400
Instrumentation for heavy ion nuclear research conference, Oak Ridge, TN, USA, 22 Oct 1984.

A spectrometer composed of lead-oxide loaded glass blocks has been constructed for detection of neutral pi mesons emitted in low energy heavy ion reactions. The spectrometer detects the Cerenkov radiation emitted when the high energy photons (E gamma approx. 70 MeV) resulting from pi exp 0 decay create electron-position pairs in the glass, initiating electromagnetic showers. A geometric acceptance of better than 5% of 4 pi is possible; the pi exp 0 detection efficiency varies between this value at T/sub pi / = 0 MeV and 1% for T/sub pi / approx. 100 MeV. (ERA citation 10:003163)

515,358
DE85002594/GAR PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Compensation Effects in Hadron Calorimeters.
T. A. Gabriel, B. L. Bishop, J. Brau, A. Di Ciaccio, and M. Goodman. 1984, 8p CONF-841007-20
Contract AC05-84OR21400
Nuclear science symposium, Orlando, FL, USA, 31 Oct 1984.
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The pros and cons of utilizing a fissionable material such as sup 238 U to compensate for the nuclear binding energy losses in a hadron calorimeter are discussed. Fissionable material can return some lost energy to the particle cascade in terms of low-energy neutrons and gamma rays, but electromagnetic sampling inefficiencies (often called transition effects) and the detection medium which tries to convert this energy to a useable signal are just as important. 12 references. (ERA citation 10:003166)

515,359
DE85002605/GAR PC **A02**/MF **A01**
Stanford Linear Accelerator Center, CA.
4 pi Detectors.
G. J. Feldman, M. G. D. Gilchriese, and J. Kirkby. Oct 84, 12p SLAC-PUB-3460, CONF-8406198-17
Contract AC03-76SF00515
Design and utilization of the superconducting super collider summer study, Snowmass, CO, USA, 23 Jun 1984.
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The 4 pi Detector Working Group tried to address two major questions: (1) can general 4 pi detectors be built for the SSC that will be able to study rare processes at center-of-mass energies of 40 TeV and at luminosities of 10 exp 33 cm exp -2 sec exp -1 ; and (2) what are realistic cost estimates for such detectors. To try to answer these questions, the group split into three subgroups, each of which worked fairly independently to design a detector. Gary Feldman led the subgroup that designed a nonmagnetic detector called D1; Gil Gilchriese led the subgroup that designed a magnetic detector called SCD, which employs conventional technology; and Jasper Kirkby led the subgroup that designed a magnetic detector called SciFiD, which has a non-conventional tracking system. The general conclusions of these studies were that these types of detectors could be built, would be able to do physics under these conditions, and would each cost between 200 and 300 million dollars. (ERA citation 10:003201)

515,360
N85-13560/6/GAR PC **A03**/MF **A01**

Washington Univ., St. Louis, MO. Center for the Space Sciences.
Scintillator-Fiber Charged Particle Track-Imaging Detector.
W. R. Binns, M. H. Israel, and J. Klarmann. 1983, 28p NAS 1.26:174160, NASA-CR-174160
Contracts NAGW-122, NGL-26-008-001
Submitted for Publication.

A scintillator-fiber charged-particle track-imaging detector was developed using a bundle of square cross section plastic scintillator fiber optics, proximity focused onto an image intensified charge injection device (CID) camera. The tracks of charged particle penetrating into the scintillator fiber bundle are projected onto the CID camera and the imaging information is read out in video format. The detector was exposed to beams of 15 MeV protons and relativistic Neon, Manganese, and Gold nuclei and images of their tracks were obtained. Details of the detector technique, properties of the tracks obtained, and preliminary range measurements of 15 MeV protons stopping in the fiber bundle are presented.

18E. Nuclear Power Plants

515,361
DE85002324/GAR PC **A02/MF A01**
Applied Psychological Services, Inc., Wayne, PA.
Maintenance Personnel Performance Simulation (MAPPS) Model.
A. I. Siegel, W. D. Bartter, J. J. Wolf, H. E. Knee, and P. M. Haas. 1984, 6p CONF-841099-6
Contract AC05-84OR21400
Human Factors Society annual meeting, San Antonio, TX, USA, 22 Oct 1984.
Portions are illegible in microfiche products.

A stochastic computer model for simulating the actions and behavior of nuclear power plant maintenance personnel is described. The model considers personnel, environmental, and motivational variables to yield predictions of maintenance performance quality and time to perform. The mode has been fully developed and sensitivity tested. Additional evaluation of the model is now taking place. (ERA citation 10:002282)

515,362
DE85002326/GAR PC **A02/MF A01**
Oak Ridge National Lab., TN.
Nuclear Power Plant Control Room Operators' Performance Research.
L. H. Gray, and P. M. Haas. 1984, 3p CONF-841099-7
Contract AC05-84OR21400
Human Factors Society annual meeting, San Antonio, TX, USA, 22 Oct 1984.

A research program is being conducted to provide information on the performance of nuclear power plant control room operators when responding to abnormal/emergency events in the plants and in full-scope training simulators. The initial impetus for this program was the need for data to assess proposed design criteria for the choice of manual versus automatic action for accomplishing safety-related functions during design basis accidents. The program also included studies of training simulator capabilities, of procedures and data for specifying and verifying simulator performance, and of methods and applications of task analysis. (ERA citation 10:002283)

515,363
NUREG/CR-2000-V3-N11/GAR PC **A04/MF A01**
Oak Ridge National Lab., TN.
Licensee Event Report (LER) Compilation for Month of November 1984.
Monthly rept.
Dec 84, 64p ORNL/NSIC-200-VOL-3-NO-11
See also NUREG/CR-2000-V3-N10.

This monthly report contains Licensee Event Report (LER) operational information that was processed into the LER data file of the Nuclear Safety Information Center (NSIC) during the one month period identified on the cover of the document. The LER summaries in this report are arranged alphabetically by facility name and the chronologically by event date for each facility. Component, system, keyword, system and general keyword indexes follow the summaries.

515,364
NUREG/CR-2000-V3-N12/GAR PC **A03/MF A01**
Oak Ridge National Lab., TN.
Licensee Event Report (LER) Compilation for Month of December 1984.
Monthly rept.
Jan 85, 48p ORNL/NSIC-200-VOL-3-NO-12
See also NUREG/CR-2000-V3-N11.

This monthly report contains Licensee Event Report (LER) operational information that was processed into the LER data file of the Nuclear Safety Information Center (NSIC) during the one month period identified on the cover of the document. The LER summaries in this report are arranged alphabetically by facility name and the chronologically by event date for each facility. Component, system, keyword, system and generai keyword indexes follow the summaries.

515,365
NUREG/CR-3817/GAR PC **A06/MF A01**
Battelle Pacific Northwest Labs., Richland, WA.
Development, Use and Control of Maintenance Procedures in Nuclear Power Plants: Problems and Recommendations.
Technical rept.,
M. H. Morgenstern, V. E. Barnes, L. R. Radford, W. A. Wheeler, and R. V. Badalamente. Jan 85, 118p PNL-5121
Also pub. as Battelle Human Affairs Research Centers, Seattle, WA. rept. no. BHARC-400/84/014.

This report describes the results of activities conducted to assess and document the need for guidance or regulatory involvement by the Nuclear Regulatory Commission (NRC) in the development, upgrading, use and control of maintenance procedures in U.S. nuclear power plants. Reported are the findings of the following four activities: (1) a survey of current maintenance procedure practices in seven U.S. nuclear power plants, (2) a review and analysis of plant administrative and maintenance procedures, (3) a survey of maintenance procedure practices in industries that share some characteristics with the nuclear industry, and (4) a review of the research pertaining to job performance aids and a brief analysis of their applicability to maintenance in nuclear power plants. Based on these findings, several recommendations for NRC action to upgrade maintenance procedure programs are offered.

515,366
NUREG-0540-V6-N10/GAR PC **A24/MF A01**
Nuclear Regulatory Commission, Washington, DC. Div. of Technical Information and Document Control.
Title List of Documents Made Publicly Available October 1-31, 1984.
Monthly rept.
Dec 84, 567p
See also NUREG-0540-V6-N9.

This document is a monthly publication containing descriptions of information received and generated by the U.S. NRC. This information includes (1) docketed material associated with civilian nuclear power plants and other uses of radioactive materials, and (2) non-docketed material received and generated by NRC pertinent to its role as a regulatory agency. The following indexes are included: Personal Author Index, Corporate Source Index, Report Number Index, and Cross Reference to Principal Documents Index.

515,367
NUREG-0606-V6-N4/GAR PC **A04/MF A01**
Nuclear Regulatory Commission, Washington, DC. Office of Nuclear Reactor Regulation.
Unresolved Safety Issues Summary (Aqua Book), August 16, 1984 - November 16, 1984.
Nov 84, 52p
See also NUREG-0606-V6-N3.

The report provides an overview of the status of the progress and plans for resolution of the generic tasks addressing 'Unresolved Safety Issues' as reported to Congress.

515,368
NUREG-0750-V18/GAR PC **A99/MF E12**
Nuclear Regulatory Commission, Washington, DC. Div. of Technical Information and Document Control.
Nuclear Regulatory Commission Issuances. Volume 18. Opinions and Decisions of the Nuclear Regulatory Commission with Selected Orders, July 1, 1983-December 31, 1983.
1983, 1569p
See also NUREG-0750-V17.

This is the eighteenth volume of issuances (1-1482) of the Nuclear Regulatory Commission and its Atomic Safety and Licensing Appeal Boards, Atomic Safety and Licensing Boards, and Administrative Law Judge.

515,369
NUREG-0787-SUP-N9/GAR PC **A20/MF A01**
Nuclear Regulatory Commission, Washington, DC. Office of Nuclear Reactor Regulation.
Safety Evaluation Report Related to the Operation of Waterford Steam Electric Station, Unit No. 3, Docket No. 50-382, Louisiana Power and Light Company. Supplement Number 9.
Dec 84, 453p
See also NUREG-0787-SUP-N8.

Supplement No. 9 to the Safety Evaluation Report for Louisiana Power & Light's application for a license to operate Waterford Steam Electric Station, Unit 3 (Docket No. 50-382), located in St. Charles Parish, Louisiana, has been jointly prepared by the Office of Nuclear Reactor Regulation and the Region IV Office of the U.S. Nuclear Regulatory Commission. This supplement provides the results of the staff's completion of its evaluation of approximately 350 allegations and concerns of poor construction practices at the Waterford 3 facility.

515,370
NUREG-0857-SUP-N7/GAR PC **A08/MF A01**
Nuclear Regulatory Commission, Washington, DC. Office of Nuclear Reactor Regulation.
Safety Evaluation Report Related to the Operation of Palo Verde Nuclear Generating Station, Units 1, 2, and 3, Docket Nos. STN 50-528, STN 50-529, and STN 50-530, Arizona Public Service Company, et al. Supplement Number 7.
Dec 84, 159p
See also NUREG-0857-SUP-N6.

Supplement No. 7 to the Safety Evaluation Report for the application filed by Arizona Public Service Company, et al, for licenses to operate the Palo Verde Nuclear Generating Station, Units 1, 2 and 3 (Docket Nos. STN 50-528/529/530), located in Maricopa County, Arizona has been prepared by the Office of Nuclear Reactor Regulation of the U.S. Nuclear Regulatory Commission. The purpose of this supplement is to update the Safety Evaluation Report by providing an evaluation of (1) additional information submitted by the applicants since Supplement No. 6 was issued and (2) matters that the staff had under review when Supplement No. 6 was issued.

515,371
NUREG-1064/GAR PC **A17/MF A01**
Nuclear Regulatory Commission, Washington, DC. Office of Nuclear Reactor Regulation.
Final Environmental Statement Related to the Operation of Millstone Nuclear Power Station, Unit No. 3, Docket No. 50-423, Northeast Nuclear Energy Company, et al.
Technical environmental rept. Jul 84-Jan 85.
Dec 84, 398p

The information in this Final Environmental Statement is the second assessment of the environmental impact associated with the construction and operation of the Millstone Nuclear Power Station, Unit No. 3, located in Waterford Township, New London County, Connecticut. The first assessment was the Final Environmental Statement related to construction issued in February 1974 prior to issuance of the Millstone Unit 3 Construction Permit. The Draft Environmental Statement related to operation was issued in July 1984. The present assessment is the result of the NRC staff's review of the activities associated with the proposed operation of the plant, and includes the staff response to comments on the Draft Environmental Statement.

515,372
PB85-139269/GAR PC **E05/MF E05**
Open Univ., Milton Keynes (England). Energy Research Group.

Reflections on Britain's Nuclear History: A Conversation with Lord Hinton.
D. Lowry. Sep 84, 76p ERG-048

The report consists of a transcription of an interview conducted by the author with Lord Hinton of Bankside, on the 19th January 1983. An outline of the issues explored includes the following items: (1) Secrecy of the UK power industry arising from its origins with the military research and development; (2) The early dominance of the UKAEA and what effects that had on the first, second and third reactor programs, though with a concentration on the first of these; (3) Some questions on 'plutonium credits'; (4) (a) A conundrum-why did the CEGB start off being reluctant to accept nuclear power as part of its main generating system and now appear very much in favor of nuclear power. (b) What was the role of the Berkeley Nuclear Research Centre, as set up in 1961; (5) The private and public debate over the early economic appraisals of nuclear power, with particular reference to the study by Leslie Hannah.

18F. Radiation Shielding and Protection

515,373
DE84017005/GAR PC **A02**
Sandia National Labs., Albuquerque, NM.
Coolability of UO2 Debris Beds in Pressurized Water Pools: DCC-1 and DCC-2 Experiment Results.
A. W. Reed, E. D. Bergeron, K. R. Boldt, and T. R. Schmidt. Sep 84, 18p SAND-84-1837C, CONF-841174-6
Contract AC04-76DP00789
Information exchange meeting on debris coolability, Los Angeles, CA, USA, 7 Nov 1984.
Paper copy only, copy does not permit microfiche production.

DCC-1 and DCC-2 (Degraded Core Coolability) have provided the first in-pile data for water-urania dryout heat flux and quench behavior. DCC-1, designed to test the laminar flow region of dryout, has displayed unexpected results. while the dryout fluxes at one atmosphere are approximately those predicted by many of the models, the pressure dependence of the dryout data is predicted by none of the models. The quench behavior of DCC-1 displays none of the fingering observed in out-of-pile experiments. The quench times extend for hours. The DCC-2 dryout data conforms in magnitude and pressure dependence with several of the models. In addition to global dryouts, in which the dry zone extends across the width of the bed, local dryouts were observed. These are zones of lower than average permeability which dry out and achieve stable temperatures without eliminating coolant flow to the bottom of the bed. The quench times in DCC-2 are only a few minutes long. Fingering, modified by the radially varying temperature of the dry particles, was observed. (ERA citation 10:004751)

515,374
DE84017007/GAR PC **A02/MF A01**
Sandia National Labs., Albuquerque, NM.
Coolability of UO sub 2 with Downward Heat Removal: The D10 Experiment.
G. W. Mitchell, C. A. Ottinger, and H. Meister. 1984, 11p SAND-84-1144C, CONF-841174-2
Contract AC04-76DP00789
Information exchange meeting on debris coolability, Los Angeles, CA, USA, 7 Nov 1984.
Portions are illegible in microfiche products.

The Debris Coolability Progrram at Sandia National Laboratories (SNL) began in 1975 to investigate the coolability of particle beds which may form following a severe accident involving core disassembly in a nuclear reactor. The Debris Bed Experiment which comprise the program are conducted in the SNL Annular Core Research Reactor (ACCR) by fission heating fully enriched urania which is submerged in a sodium pool. The experiment provide data which form the basis for the development of detailed phenomenological models. D10 is the first in the series to study the effects of bottom cooling which might be provided by structural materials onto which the reactor debris might settle in an accident condition. Additionally, it was designed to achieve temperatures in the debris approaching the melting point of UO sub 2 to investigate any change in coolability which might occur at those temperatures. These objectives were successfully met during the experiment, which was operated for a period of over 53 hours. Downward cooling was investigated under subcooled, packed bed and channeled bed conditions. Packed bed and channeled bed dryout powers were determined under several downward cooling conditions. Extended dryouts were established with maximum temperatures in the bed of 2500 exp 0 C. (ERA citation 10:002396)

515,375
DE85000076/GAR PC **A02/MF A01**
Argonne National Lab., IL.
Modeling of Core Debris-Sodium-Concrete Interactions.
F. B. Cheung, D. R. Pedersen, and D. H. Nguyen. 1984, 11p CONF-841174-3
Contract W-31-109-ENG-38
Information exchange meeting on debris coolability, Los Angeles, CA, USA, 7 Nov 1984.

The interactions between sodium and concrete in the presence of heat-generating core debris resulting from a postulated core meltdown accident in a sodium-cooled fast reactor are complex yet important phenomena relevant to several key safety issues. In particular, the attack of sodium and of core debris on the concrete basemat below the reactor cavity, the generation of hydrogen gas, and the pressurization of the reactor building as a result of the interactions represent, among others, the major sources that provide a challenge to containment integrity. Thus far, no physical model has been developed to describe the nature and the extent of sodium-concrete interactions wth core debris present. It is the purpose of this study to provide a complete physical description of the scenario involved in the core debris-sodium-concrete interactions, starting from the chemical erosion phase through the molten pool formation phase to the long-term melt penetration phase. (ERA citation 10:002354)

515,376
DE85000077/GAR PC **A02/MF A01**
Argonne National Lab., IL.
Debris Dispersal in Reactor Material Experiments on Corium-Water Thermal Interactions in Ex-Vessel Geometry.
J. J. Sienicki, B. W. Spencer, and D. Squarer. 1984, 9p CONF-840816-21
Contract W-31-109-ENG-38
22. national heat transfer conference, Niagara Falls, NY, USA, 5 Aug 1984.
Portions are illegible in microfiche products.

An analysis has been performed of corium sweepout behavior in the ANL/EPRI CWTI-series reactor material experiments involving the gas pressure-driven injection of molten corium into the reactor cavity region of a 1:30 scale mockup of a PWR containment. A computer model was developed to calculate the sweepout versus retention of corium and water from the cavity. The model consists of hydrodynamics and freezing calculations describing the pressure-driven two-phase flow of corium, water, steam and gas out of the cavity, freezing of corium upon structural surfaces, and levitation of corium within the cavity by the vessel blowdown gas jet. The model has had good success predicting the disposition of corium for the available CWTI tests, indicating retention in the cavity of between 40 and 70% of the injected corium masses. For conditions representative of the TMLB' sequence in the reactor system, the model predicts essentially complete sweepout of corium from the full-scale cavity region before the dispersive forces arising from the blowdown of the primary system have decayed. However, this large sweepout does not imply that the swept out material would deliver its energy directly to the containment atmosphere. (ERA citation 10:002343)

515,377
DE85000097/GAR PC **A02/MF A01**
Argonne National Lab., IL.
Bubble-Induced Mixing of Two Horizontal Liquid Layers with Non-Uniform Gas Injection at the Bottom.
F. B. Cheung, G. Leinweber, and D. R. Pedersen. 1984, 11p CONF-841174-5
Contract W-31-109-ENG-38
Information exchange meeting on debris coolability, Los Angeles, CA, USA, 7 Nov 1984.
Portions are illegible in microfiche products.

During a postulated severe core meltdown accident in an LMFBR, a large amount of sodium coolant may spill into the reactor concrete cavity. A layer of liquid products may form as a result of the sodium-concrete reactions. The liquid product layer, which is highly viscous and much heavier than sodium, separates the concrete from the sodium pool. In general, the downward transport of sodium through the liquid product layer to the unreacted concrete surface, which controls the rate of chemical erosion of the concrete, depends strongly on the agitation induced by gas evolution from the heated concrete. In this study, experiments were conducted to explore the effect of non-uniform gas injection on mixing of two horizontal mutually soluble liquid layers. The liquid in the lower layer was chosen to be more viscous and heavier than the liquid in the upper layer. To simulate the reactor accident situation, gas was injected at the bottom of the liquid-liquid system through a circular hole that covered only the center portion of the bottom surface of the lower liquid layer. The bubble-induced mixing motions were observed and the rate of mixing was measured for different hole sizes and for various gas flow rates. (ERA citation 10:002355)

515,378
DE85000611/GAR PC **A02/MF A01**
Sandia National Labs., Albuquerque, NM.
Hydrogen Flame Acceleration and Transition to Detonation.
M. P. Sherman. 1984, 20p SAND-84-2078C, CONF-8410142-17
Contract AC04-76DP00789
12. water reactor safety research information meeting, Gaithersburg, MD, USA, 23 Oct 1984.
Portions are illegible in microfiche products.

This paper describes the results obtained from two large experimental facilities built at Sandia National Laboratories in Albuquerque, NM. FLAME (Flame Acceleration Measurements and Experiments) is a large horizontal rectangular channel designed to study flame acceleration, transition to detonation, simulation of combustion in containment geometries, component heating, and other problems in hydrogen combustion relevant to reactor safety. The Heated Detonation Tube has been designed to study detonations in hydrogen-air-steam mixtures. Both facilities have been in operation for just over a year. 12 figures. (ERA citation 10:002401)

515,379
DE85001075/GAR PC **A02/MF A01**
Lawrence Livermore National Lab., CA.
Finite Element Method for Solving Neutron Transport Problems.
J. M. Ferguson, and A. Greenbaum. 21 Mar 84, 8p UCRL-90579, CONF-840901-19
Contract W-7405-ENG-48
ANS topical meeting on reactor physics and shielding, Chicago, IL, USA, 17 Sep 1984.

A finite element method is introduced for solving the neutron transport equations. Our method falls into the category of Petrov-Galerkin solution, since the trial space differs from the test space. The close relationship between this method and the discrete ordinate method is discussed, and the methods are compared for simple test problems. (ERA citation 10:001519)

515,380
DE85001194/GAR PC **A09/MF A01**
Hanford Engineering Development Lab., Richland, WA.
Conceptual Design Report for a Remotely Operated Cask Handling System. Revision 1.
J. A. Yount, and J. D. Berger. Sep 84, 200p HEDL-7376-Rev.1, TTC-0449-Rev.1
Contract AC06-76FF02170
Portions are illegible in microfiche products.

Recent advances in remote handling utilizing commercial robotics are conceptually applied to lowering operator cumulative radiation exposure and increasing throughput during cask handling operations in nuclear shipping and receiving facilities. Revision 1 incorporates functional criteria for facility equipment, equipment technical outline specifications, and interface control drawings to assist Architect Engineers in the application of remote handling to waste shipping and receiving facilities. The document has also been updated to show some of the equipment used in proof-of-principle testing during fiscal year 1984. 10 references, 50 figures, 1 table. (ERA citation 10:000295)

515,381
DE85001535/GAR PC **A13/MF A01**
Monsanto Research Corp., Miamisburg, OH. Mound.
Waste Accountability, Shipping, and Packaging (WASP) Handbook.
J. A. Jackson. Sep 84, 276p MLM-MU-84-69-0001
Contract AC04-76DP00053
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An overview of Mound's WASP System is presented to other DOE contractors who will be shipping transuranic (TRU) waste to the Waste Isolation Pilot Plant (WIPP) site; it focuses on how to meet the information requirements specified by the WIPP. Other contractors may use this document as a planning tool in various ways: (1) they may be able to incorporate the ideas and concepts presented here in their own system; (2) they may, if they have an operating system compatible with that of Mound, implement the whole system intact at their own site; or (3) they may extract parts of the system for their own use. Mound will supply the source code for our programs to any site attempting to use the system intact. The main considerations in determining the compatibility of a specific site are that it currently uses COBOL and MFS (IBM's Message Format Service), and that it uses the IMS Data Base Management System. It may be possible for a site using COBOL and MFS but some other data base management system to convert the COBOL programs to run under their system; however, since IMS is a hierarchical data base management sustem, it would be important that the system being used also be hierarchical. Thus, the programs could be converted without having to change the basic logic within them. (ERA citation 10:000305)

515,382
DE85002198/GAR PC **A05/MF A01**
Oak Ridge National Lab., TN.
Personnel Radiation Dosimetry Symposium: Program and Abstracts.
Oct 84, 86p CONF-841003-Absts.
Contract AC05-84OR21400
Personnel radiation dosimetry symposium, Knoxville, TN, USA, 15 Oct 1984.
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The purpose was to provide applied and research dosimetrists with sufficient information to evaluate the status and direction of their programs relative to the latest guidelines and techniques. A technical program was presented concerning experience, requirements, and advances in gamma, beta, and neutron personnel dosimetry. (ERA citation 10:003870)

515,383
DE85002430/GAR PC **A02/MF A01**
Sandia National Labs., Albuquerque, NM.
Applications of the CONTAIN 1.0 Computer Code to the Analysis of Containment Loading under Severe Accident Conditions.
K. D. Bergeron, D. C. Williams, and P. E. Rexroth. 1984, 23p SAND-84-1868C, CONF-8410142-14
Contract AC04-76DP00789
12. water reactor safety research information meeting, Gaithersburg, MD, USA, 23 Oct 1984.

Recently, the computer code CONTAIN 1.0 was released; it is intended to be the US NRC's principal best estimate calculational tool for severe accident containment analysis. It models all three phenomenological areas of interest in such analyses: thermal-hydraulics, aerosol behavior, and fission product decay, heating and transport. As the code has matured, and as validation and testing have generated confidence in its predictions, it has been found to be useful in a number of NRC studies over the past year. This paper discusses some of the more interesting results which have been obtained when CONTAIN 1.0 has been applied to practical accident sequence calculations. Several elements of NRC's source term work have made use of CONTAIN. For example, a large number of parametric calculations were run for the Containment Loads Working Group. Phenomena studied included the effect of heat sinks on steam spikes, and the effect of direct heating of the containment atmosphere by finely dispersed hot debris. More recently, a number of parameter studies have been run for NRC's source term study relating to the effects of pressure- or temperature-dependent containment leakage, and of containment isolation failure. These two sets of calculations are the focus of this paper. Other recent applications of CONTAIN are also cited but not reviewed in detail. (ERA citation 10:002399)

515,384
DE85002442/GAR PC **A02/MF A01**
Risk Management Associates, Albuquerque, NM.
MARCON - Development and Applications to Containment Loading Calculations.
C. J. Shaffer, R. D. Gasser, F. E. Haskin, and V. L. Behr. 1984, 23p SAND-84-2172C, CONF-8410142-13
Contract AC04-76DP00789
12. water reactor safety research information meeting, Gaithersburg, MD, USA, 23 Oct 1984.

MARCON was developed to permit investigation of the impact of state-of-the-art core-concrete modeling on containment loading predictions. The subroutine INTER of MARCH 2 (Version 111) was replaced with the most recent version of CORCON (CORCON-MOD2). An interfacing subroutine was developed which passes the necessary parameters between CORCON and the MARCH subroutine (MACE) which calculates the containment pressure temperature response. Representative comparisons are included for both PWR and BWR containment loading calculations. (ERA citation 10:002402)

515,385
DE85002444/GAR PC **A03/MF A01**
Battelle Pacific Northwest Labs., Richland, WA.
Comparison of Structural Computer Programs Used for the Analysis of Spent Fuel Shipping Casks.
J. R. Friley. Sep 84, 50p PNL-4161, TTC-0306
Contracts AC04-76DP00789, AC06-76RL01830
Portions are illegible in microfiche products.

Several structural analysis computer programs were selected and used in analyses relevant to the hypothetical impact requirements for spent fuel shipping cask designs. The objective of the study was to evaluate the computer codes by performing a series of analyses and comparing results. The code evaluation efforts treated end and side impact situations only. As a result, the models were either one or two dimensional. Both clad lead and solid wall construction types were considered. For clad lead models, frictionless sliding between the lead and cladding was assumed. General agreement was achieved between the codes for problems involving non-clad models. For clad models, agreement between the codes was poor. This work was sponsored by the Department of Energy through the Transportation Technology Center at Sandia National Laboratories, Albuquerque, New Mexico. 16 references, 18 figures, 9 tables. (ERA citation 10:002970)

18G. Radioactive Wastes and Fission Products

515,386
DE84013462/GAR PC **A02/MF A01**
Argonne National Lab., IL.
Actinide Separations by Supported Liquid Membranes.
P. R. Danesi, E. P. Horwitz, P. Rickert, and R. Chiarizia. 1984, 10p CONF-841210-2
Contract W-31-109-ENG-38
International chemical congress of Pacific Basin Societies, Honolulu, HI, USA, 16 Dec 1984.

The work has demonstrated that actinide removal from synthetic waste solutions using both flat-sheet and hollow-fiber SLM's is a feasible chemical process at the laboratory scale level. The process is characterized by the typical features of SLM's processes: very small quantities of extractant required; the potential for operations with high feed/strip volume ratios, resulting in a corresponding concentration factor of the actinides; and simplicity of operation. Major obstacles to the implementation of the SLM technology to the decontamination of liquid nuclear wastes are the probable low resistance of polypropylene supports to high radiation fields, which may prevent the application to high-level nuclear wastes; the unknown lifetime of the SLM; and the high Na content of the separated actinide solution. (ERA citation 10:002823)

515,387
DE84901805/GAR PC **A02/MF A01**
Processing of Highly Radioactive Nuclear Waste.
E. Detilleux. 1982, 18p CE-Trans-7930
Translated from SRBE Bull.; 98: No. 2, 129-136(1982). U.S. Sales Only. Portions are illegible in microfiche products.

The following four questions dealing with highly active waste are answered: what is it and where does it come from. What are the processing techniques. What is the situation in Belgium. (ERA citation 09:049563)

515,388
DE85000174/GAR PC **A02/MF A01**
Los Alamos National Lab., NM.
Recent Development in Pyrochemistry at Los Alamos.
J. A. McNeese, K. W. Fife, and J. D. Williams. 1984, 20p LA-UR-84-3233, CONF-8410166-2
Contract W-7405-ENG-36
Plutonium/uranium recovery operations conference, Oak Ridge, TN, USA, 16 Oct 1984.
Portions are illegible in microfiche products.

Recent developments in pyrochemical processing at Los Alamos include the recovery of plutonium from anodes and impure metal by pyroredox and new molten salt handling and purification techniques. The anode is dissolved in a ZnCl sub 2 KCl salt to form PuCl sub 3 and a zinc and impurities button. Calcium reduction of the PuCl sub 3 yields 95 to 98% pure plutonium. New techniques for transferring molten salt from a purification or regeneration vessel to molds has been successfully developed and demonstrated. Additional salt work involving recycle of direct oxide reduction salts using anhydrous hydrogen chloride, phosgene, and chlorine gases is under way. 13 figures, 1 table. (ERA citation 10:001960)

515,389
DE85000260/GAR PC **A03/MF A01**
Geological Survey, Menlo Park, CA.
Index to Published Geologic Maps in the Region around the Potential Yucca Mountain Nuclear Waste Repository Site, Southern Nye County, Nevada.
S. C. Fouty. 1984, 34p USGS-OFR-84-524
Contract AI08-78ET44802
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Yucca Mountain, located in southern Nye County, Nevada is currently being investigated as a potential site for an underground high-level radioactive waste repository. The series of index maps presented in this report provide an up-to-date reference of published geologic maps covering the Candidate Area. The published maps range in scale from 1:1200 through 1:700,000 and includes maps published by the USGS, state and commercial organizations, universities, and professional societies. USGS open-file maps also are shown, but no attempt is made to include open-file material of other organizations. Ph.D dissertations pertaining to the area are not shown on the maps but are listed in Appendix A. (ERA citation 10:000313)

515,390
DE85000413/GAR PC **A02/MF A01**
Sandia National Labs., Albuquerque, NM.
Transport and Capture of Colloidal Particles in Single Fractures.
E. J. Bonano, and W. E. Beyeler. 1984, 9p SAND-84-0810C, CONF-841157-11
Contract AC04-76DP00789
Symposium on the scientific basis for nuclear waste management, Boston, MA, USA, 26 Nov 1984.

In this study, the transport and capture rates of colloidal particles were calculated for a parallel-plate channel simulating a single fracture. The steady-state convective diffusion equation was solved with the particle velocity normal to the walls of the channel being the sum of the external forces acting on the particles. The forces considered were the gravitational, London-van der Waals and electric-double layer forces. The effects of parameters governing these forces and particle production mechanism on the rates of particle capture and transport are determined. The dynamic balance between particle production and capture has a significant effect on the concentration of particles leaving the fracture. The average particle velocity, though higher than the average fluid velocity, seems to be insensitive to phenomena governing particle capture. 8 references, 5 figures. (ERA citation 10:002005)

515,391
DE85000558/GAR PC **A06/MF A01**

Rockwell International, Richland, WA. Rockwell Hanford Operations.
Rockwell Hanford Operations Defense Waste and Byproducts Management Monthly Report for July 1984.
Jul 84, 113p RHO-PB-SR-10-B-WM-July-84
Contract AC06-77RL01030
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Approximately 9000 gallons of interstitial liquid was pumped from BY Tank Farm saltwells. A total of 463,000 gallons of liquid has been pumped from single-shell tanks FYTD. Twenty-one strontium capsules were stored in the WESF pool cell for a year-to-date total of 135. Twenty acres of the B-3 ditches were surface stabilized, completing the B-3 ditches. A total of 149 acres of outdoor radiation areas has been surface stabilized fiscal year-to-date versus an annual goal of 75 acres. 242-S Evaporator Run 84-5 continued. The throughput for the Run 84-5 is approximately 3.4 million gallons; the total FYTD evaporator throughput is approximately 19.8 million gallons. Run 84-5 will be completed in early August, after which the evaporator will be down for an approximately two-week maintenance outage. The conceptual design report for Project B-492, Shallow Land Disposal Site, was issued. Definitive design by Kaiser Engineers Hanford is continuing. The first design package was sent to Rockwell for review on August 1. Other packages will be phased through the next several months, as the design is planned in three distinct phases with packages in each phase. (ERA citation 10:000309)

515,392
DE85000777/GAR PC **A03**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Predicting Long-Term Moisture Contents of Earthen Covers at Uranium Mill Tailings Sites.
G. W. Gee, K. K. Nielson, and V. C. Rogers. Sep 84, 46p DOE/UMT-0220, PNL-5047
Contract AC06-76RL01830

The three methods for long-term moisture prediction covered in this report are: estimates from water retention (permanent wilting point) data, correlation with climate and soil type, and detailed model simulation. The test results have shown: soils vary greatly in residual moisture. Expected long-term moisture saturation ratios (based on generalized soil characteristics) range from 0.2 to 0.8 for soils ranging in texture from sand to clay, respectively. These values hold for noncompacted field soils. Measured radon diffusion coefficients for soils at 15-bar water contents ranged from 5.0E-2 cm exp 2 /s to 5.0E-3 cm exp 2 /s for sands and clays, respectively, at typical field densities. In contrast, fine-textured pit-run earthen materials, subjected to optimum compaction (>85% Proctor density) and dried to the 15-bar water content, ranged from 0.7 to 0.9 moisture saturation. Compacted pit-run soils at these moisture contents exhibited radon diffusion coefficients as low as 3.0E-4 cm exp 2 /s. The residual moisture saturation for cover soils is not known since no engineered barrier has been in place for more than a few years. A comparison of methods for predicting moisture saturation indicates that model simulations are useful for predicting effects of climatic changes on residual soil moisture, but that long-term moisture also can be predicted with some degree of confidence using generalized soil properties or empirical correlations based both on soils and climatic information. The optimal soil cover design will likely include more than one layer of soil. A two-layer system using a thick (1-m minimum) plant root zone of uncompacted soil placed over a moistened, tightly compacted fine-textured soil is recommended. This design concept has been tested successfully at the Grand Junction, Colorado, tailings piles. (ERA citation 10:000327)

515,393
DE85000782/GAR PC **A03**/MF **A01**
Argonne National Lab., IL.
Mathematical Modeling and Evaluation of Radionuclide Transport Parameters from the ANL Laboratory Analog Program.
B. C. J. Chen, J. R. Hull, M. G. Seitz, W. T. Sha, and V. L. Shah. Jul 84, 32p ANL-84-13
Contract W-31-109-ENG-38

Computer model simulation is required to evaluate the performance of proposed or future high-level radioactive waste geological repositories. However, the accuracy of a model in predicting the real situation depends on how well the values of the transport properties are prescribed as input parameters. Knowledge of transport parameters is therefore essential. We have modeled ANL's Experiment Analog Program which was designed to simulate long-term radwaste migration process by groundwater flowing through a high-level radioactive waste repository. Using this model and experimental measurements, we have evaluated neptunium (actinide) deposition velocity and analyzed the complex phenomena of simultaneous deposition, erosion, and reentrainment of bentonite when groundwater is flowing through a narrow crack in a basalt rock. The present modeling demonstrates that we can obtain the values of transport parameters, as added information without any additional cost, from the available measurements of laboratory analog experiments. 8 figures, 3 tables. (ERA citation 10:000317)

515,394
DE85000787/GAR PC **A03**/MF **A01**
Earth Technology Corp., Houston, TX.
Near-Dome Geologic Findings - Richton Dome, Mississippi: Annual Status Report for FY 83.
Oct 84, 27p BMI/ONWI-555
Contract AC02-83CH10140
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Basin Analysis is a study of the regional and local stratigraphic, tectonic, and salt-tectonic conditions that influenced the development of the Mississippi Salt Basin and Richton Dome, an element within that basin. During FY 83, work was concentrated on the local area surrounding Richton Dome and included the writing of the Midyear FY 83 Richton Dome Screening and Suitability Review, input to the Site Characterization Plan that is being prepared by the Southern Region Geologic Project Manager, and initial development of a near-dome geologic model. The geologic model was compiled using information from approximately 300 oil and gas well geophysical logs and 128 line km (80 line mi) of seismic-reflection profiles. In addition to analysis and interpretation of the logs and profiles, stratigraphic data from each were assembled in a computer-based file and were used to produce computer-generated structural contour maps. Major findings from the analyses include a new configuration for the northern end of Richton Dome and improved definitions of near-dome faults and the rim syncline on the northern and eastern flanks of Richton Dome. 4 references, 6 figures. (ERA citation 10:000252)

515,395
DE85000826/GAR PC **A02**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Hydrologic Considerations for Rock RIPRAP Protection of Uranium Tailings Impoundments.
W. H. Walters, and R. L. Skaggs. Feb 84, 9p PNL-SA-11657, CONF-840245-15
Contract AC06-76RL01830
Symposium on management of uranium mill tailings, low-level waste, and hazardous waste, Ft. Collins, CO, USA, 1 Feb 1984.

Pacific Northwest Laboratory is conducting an in-depth study of the application of rock riprap for the long-term protection of uranium tailings impoundments. Decommissioned tailings sites at Grand Junction and Slickrock, Colorado were selected to review the application of riprap design methods and evaluate variable sensitivity and data requirements. Preliminary results from the Grand Junction case study indicate that the use of a safety factor in sizing the rock riprap may provide an overly conservative design that may not be justified. Some safety factor, usually a value of 1.5 to 2.0 is normally used in riprap design to allow for the uncertainties in the hydraulic calculations. The computation of the hydraulic designs variables using the probable maximum flood (PMF) event introduces conservatism into the design and the added safety factor may not be warranted. This paper presents some preliminary results from the Grand Junction site concerning the implications of using a safety factor for riprap design. 9 references, 2 figures, 2 tables. (ERA citation 10:002010)

515,396
DE85000828/GAR PC **A02**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Evaluation of Chemical Stabilizers and Windscreens for Wind Erosion Control of Uranium Mill Tailings.
M. R. Elmore, and J. N. Hartley. Aug 84, 20p PNL-SA-12382, CONF-840859-2
Contract AC06-76RL01830
Symposium on the transfer and utilization of particulate control technology, Kansas City, MO, USA, 27 Aug 1984.

Potential wind erosion of uranium mill tailings is a concern for the surface disposal of tailings at uranium mills. Wind-blown tailings may subsequently be redeposited on areas outside the impoundment. Pacific Northwest Laboratory (PNL) is investigating techniques for fugitive dust control at uranium mill tailings piles. Laboratory tests, including wind tunnel studies, were conducted to evaluate the relative effectiveness of 43 chemical stabilizers. Seventeen of the more promising stabilizers were applied to test plots on a uranium tailings pile at the American Nuclear Corporation-Gas Hills Project mill site in central Wyoming. The durabilities of these materials under actual site conditions were evaluated over time. In addition, field testing of commercially available windscreens was conducted. Test panels were constructed of eight different materials at the Wyoming test site to compare their durability. A second test site was established near PNL to evaluate the effectiveness of windscreens at reducing wind velocity, and thereby reduce the potential for wind erosion of mill tailings. Results of the laboratory land field tests of the chemical stabilizers and windscreens are presented, along with costs versus effectiveness of these techniques for control of wind erosion at mill tailings piles. 12 references, 4 figures, 6 tables. (ERA citation 10:002012)

515,397
DE85000833/GAR PC **A02**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Engineered Sorbent Barriers for Low-Level Waste.
H. D. Freeman, J. N. Hartley, and J. L. Buelt. Sep 84, 7p PNL-SA-12560, CONF-8409115-9
Contract AC06-76RL01830
Annual Low-Level Waste Management Program participants' information meeting, Denver, CO, USA, 11 Sep 1984.

The Engineered Sorbent Barrier program will evaluate and provide new and cost-effective technology for restricting the migration of radionuclides from low-level waste sites. The primary emphasis will be to identify and evaluate sorbent materials as engineered barriers at these sites. Some radionuclides in shallow land burial sites for low-level waste have been shown to form complexants induced by the presence of organics, microbial processes, chemical decomposition, or radiation. Complexants can increase radionuclide mobility and reduce their affinity for clay minerals in the foundation soil. To reduce or prevent this migration, materials could be designed to sorb radionuclides from the leachate at the base of a burial site. The sorbent materials may be used at disposal sites for buried low-level defense wastes requiring remedial action or for commercially generated wastes. The sorbent materials, such as natural or synthetic zeolites or carbon sorbates, would be amended to the foundation soil at these sites to improve the natural effectiveness of the clay or soil. This paper describes the concepts that will be investigated over the next two years. Since this program began only recently, no data are yet available. 9 references, 3 figures. (ERA citation 10:001982)

515,398
DE85000834/GAR PC **A02**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Transport Assessment - Arid: Measurement and Prediction of Water Movement Below the Root Zone.
G. W. Gee, and R. R. Kirkham. Sep 84, 17p PNL-SA-12508, CONF-8409115-10
Contract AC06-76RL01830
Annual Low-Level Waste Management Program participants' information meeting, Denver, CO, USA, 11 Sep 1984.

The amount of water transported below the root-zone and available for drainage (recharge) must be known in order to quantify the potential for leaching at low-level waste sites. Under arid site conditions, we quantified drainage by using weighing lysimeters containing sandy soil and measured 6 and 11 cm of drainage for a 1-yr period (June 1983-May 1984) from grass-covered and bare-soil surfaces, respectively. Precipitation during this period at our test site near Richland, Washington, was 25 cm. Similar drainage values were estimated from neutron probe measurements of water content profile changes in an adjacent grass-covered site. These data suggest that significant amounts of drainage can occur at arid sites when soils are coarse textured and precipitation occurs during fall and winter months. Model simulations predicted drainage values comparable to those measured with our weighing lysimeters. Long-term, 500- to 1000-yr predictions of

leaching are possible with our model simulations. However, additional studies are needed to evaluate the effect of soil variability and stochastic rainfall inputs on drainage estimates, particularly for arid sites. 15 references, 9 figures, 1 table. (ERA citation 10:000323)

515,399
DE85001197/GAR PC A02/MF A01
California Univ., Berkeley. Lawrence Berkeley Lab.
Assessing the Performance of Geologic Repositories for Nuclear Waste.
T. H. Pigford. Aug 84, 7p LBL-18270, CONF-840814-1, UCB-NE—4051
Contract AC03-76SF00098
Energy '84, Pasadena, CA, USA, 19 Aug 1984.
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Predictions of the rate of release of radionuclides from waste packages, their rates of dissolution in groundwater, their hydrogeologic transport to the environment, and their ultimate uptake by people are summarized. Both the details of performance assessment and conclusions on performance are affected by what performance criteria are adopted. 9 references, 1 figure, 1 table. (ERA citation 10:000303)

515,400
DE85001222/GAR PC A05/MF A01
Rockwell International, Richland, WA. Rockwell Hanford Operations.
Assessment of Drilling Fluid Tracers Used to Monitor Borehole Development for Hydrochemical Sampling.
D. L. Graham. May 84, 77p RHO-BW-ST-61-P
Contract AC06-77RL01030

Until recently, boreholes have been drilled for the Basalt Waste Isolation Project using water-based drilling fluids. Three drilling fluid tracers are used to monitor borehole development for hydrochemical sampling at the Basalt Waste Isolation Project. The tracers used are fluorescein dye, total organic carbon, and tritium. Used in concert, these tracers yield useful information regarding the degree to which a zone has been developed prior to final sample collection. The adequacy of these tracers in assessing borehole development has been examined using data collected from five zones within three boreholes across the Hanford Site. Field data indicate that fluorescein and total organic carbon perform well in helping to assess borehole development. Tritium data from these examples indicate that final samples collected are greater than or equal to 98 percent groundwater. Limited ionic data were available for one field example. These data indicate that certain species are affected by the introduction of drilling fluids. After the removal of about 9.5 x 10 exp 4 liters of fluid, most species appear to stabilize. However, tracer data indicate that components of drilling fluid were still present in the zone at this time. A field test is in progress to better quantify the relationship between drilling fluid tracer behavior and major chemical and isotopic species dissolved in basaltic groundwaters. 15 references, 9 figures, 5 tables. (ERA citation 10:001983)

515,401
DE85001395/GAR PC A02/MF A01
Bettis Atomic Power Lab., West Mifflin, PA.
Shippingport Atomic Power Station. Technical Progress Report, January 26, 1984-September 30, 1984.
1984, 9p WAPD-MRP-162
Contract AC11-76PN00014

During this report period, activity at the Shippingport Atomic Power Station consisted of defueling operations, shipment of spent fuel to the Expended Core Facility (ECF), and preparations for decommissioning. The remaining eight of the 39 fuel modules were removed from the reactor. These consisted of three blanket modules, and five reflector modules. Shipment of LWBR expended fuel to ECF was completed during this period. The PWR Core 2 lower core barrel was shipped from Shippingport to its burial site on May 8, 1984. Four fuel shipments were received at ECF, unloaded and stored under water. All equipment for the disassembly of spent fuel modules has arrived at ECF and was installed and checked out. The Production Irradiated Fuel Assay Gage, for proof-of-breeding, has been installed in an ECF hot cell and qualified for use. Disassembly of the first core fuel module and removal of the first 10 fuel rods was completed. Nondestructive assay has been performed on these rods. Preparation of the plant for turnover to the decommissioning agency was completed. The plant was turned over to the decommissioning agency on September 6, 1984. (ERA citation 10:002254)

515,402
DE85001406/GAR PC A04/MF A01
Los Alamos National Lab., NM.
Distribution of Radionuclides and Water in Bandelier Tuff Beneath a Former Los Alamos Liquid Waste Disposal Site after 33 Years.
J. W. Nyhan, B. J. Drennon, W. V. Abeele, G. Trujillo, and W. J. Herrera. Jul 84, 53p LA-10159-LLWM
Contract W-7405-ENG-36

The distribution of radionuclides and water in Bandelier Tuff beneath a former liquid waste disposal site at Los Alamos was investigated. The waste use history of the site was described, as well as several pertinent laboratory and field studies of water and radionuclide migration in Bandelier Tuff. The distribution of plutonium, exp 241 Am, and water was determined in a set of about 800 tuff samples collected to sampling depths of 30 m beneath two absorption beds. These data were then related to site geohydrologic data. Water and radionuclide concentrations found after 33 years were compared with the results of similar studies previously performed at this site, and the implications of these comparisons are discussed relative to nuclear waste management. 19 references, 6 figures, 4 tables. (ERA citation 10:000322)

515,403
DE85001539/GAR PC A07/MF A01
Battelle Project Management Div., Columbus, OH. Office of Nuclear Waste Isolation.
Preclosure Radiological Calculations to Support Salt Site Evaluations.
D. A. Waite. Aug 84, 138p BMI/ONWI-541
Contract AC02-83CH10140
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The purpose of this report is to provide data, methods, and results of preclosure radiological calculations to support salt site evaluations on the basis of the US Department of Energy's Siting Guidelines. The data and methods portions are of sufficient detail to enable independent analyses of the conditions specified. The results are presented for easy comparison with pertinent radiological regulations. The regulations applicable to this discussion are found in 10 CFR Part 60, which defers to 10 CFR Part 20, and in 40 CFR Part 191, which defers to 40 CFR Part 190. These regulations cover both offsite radionuclide concentrations and doses. The comparisons required by the DOE guidelines include 10 CFR Part 20 concentrations and 40 CFR Part 191 (maximum exposed individual) doses. To lend further insight into the radiological impacts of the presence of a high-level nuclear waste repository at a specific location, the population doses associated with the 40 CFR Part 190 analyses and accident doses also have been included. All concentrations and doses are found to be well below applicable standards. 27 references, 6 figures, 19 tables. (ERA citation 10:000324)

515,404
DE85002302/GAR PC A05/MF A01
Earth Technology Corp., Houston, TX.
Comments on a Letter by George D. DeBuchananne (US Geological Survey) Regarding the Use of Salt Domes for High-Level Waste Disposal.
Aug 84, 91p BMI/ONWI-511
Contract AC02-83CH10140
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The US Geological Survey (USGS) concluded in a letter to the US Department of Energy, dated March 7, 1981, that subsurface geologic conditions in bedded salt are more predictable and less complex than those in domal salt. This predictability is equated with the relative suitability of bedded and domal salt as repository host media. This report comments on the USGS letter. The key points made are as follows: Complexities which may exist in the geologic setting of a salt dome (or other potential host medium) should not a priori preclude the dome from being an acceptable host medium for a high-level waste (HLW) repository. Predictability, as used by the USGS, focused on the spatial extrapolation of information on geologic conditions and should not be confused with predicting the performance of a repository. Notwithstanding the general characteristics of bedded and domal salt, there are salt domes whose individual characteristics should make them as acceptable as potential bedded salt areas for HLW repository sites. Complexities which may occur in the geologic setting of a salt dome can be explored and characterized with sufficient accuracy by available techniques. (ERA citation 10:001971)

515,405
DE85002330/GAR PC A10/MF A01
Pennsylvania State Univ., University Park. Inst. for Research on Land and Water Resources.
Low Level Radioactive Waste Disposal Siting: A Social and Technical Plan for Pennsylvania. Volume 3. Technical Analyses.
G. Aron, R. J. Bord, F. A. Clemente, W. P. Dornsife, and A. R. Jarrett. Sep 84, 219p DOE/LLW-36T-V.3
Contract AC07-76ID01570
Portions are illegible in microfiche products.

Volume III comprises 9 chapters: Definition of Low Level Radioactive Waste; A Perspective on the Relative Toxicity of Low Level Radioactive Waste; A Generic Low Level Radioactive Waste Disposal Facility Description; An Economic Analysis of a Generic Low Level Radioactive Waste Disposal Facility; Site Selection; Geology-Pennsylvania Specific; Technical Considerations; Disposal Cell Stability; and Site Monitoring Considerations. (ERA citation 10:001974)

515,406
DE85002331/GAR PC A08/MF A01
Pennsylvania State Univ., University Park. Inst. for Research on Land and Water Resources.
Low Level Radioactive Waste Disposal Siting: A Social and Technical Plan for Pennsylvania. Volume 2. Socioeconomic Analyses.
G. Aron, R. J. Bord, F. A. Clemente, W. P. Dornsife, and A. R. Jarrett. Sep 84, 173p DOE/LLW-36T-V.2
Contract AC07-76ID01570
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Volume II comprises five chapters: Socioeconomic Screening Criteria for LLRW Facility Siting and An Application to Counties in Pennsylvania; Evaluating Public Participation Options for the Case of Low Level Radioactive Waste Siting in Pennsylvania; Potential Socioeconomic Impacts of a LLRW Facility in Pennsylvania; The Role of Community Incentives in Low Level Radioactive Waste Management; and Institutional Aspects of LLRW Site Development and Operations in Pennsylvania. (ERA citation 10:001973)

515,407
DE85002332/GAR PC A05/MF A01
Pennsylvania State Univ., University Park. Inst. for Research on Land and Water Resources.
Low Level Radioactive Waste Disposal Siting: A Social and Technical Plan for Pennsylvania. Volume 1. An Overview of Options and Alternatives.
G. Aron, R. J. Bord, F. A. Clemente, W. P. Dornsife, and A. R. Jarrett. Sep 84, 79p DOE/LLW-36T-V.1
Contract AC07-76ID01570
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The report contains the research results of a comprehensive analysis of the social and technical options available to decision makers to develop a plan for a LLRW site in Pennsylvania. The research was conducted by a team of social scientists, engineers and physical scientists at The Pennsylvania State University and the Pennsylvania Department of Environmental Resources. While the full range of professional literature and analyses were utilized, the particular focus of the project is LLRW site development considerations specific to Pennsylvania. The research team concentrated on two broad sets of issues: (1) Social Science aspects of the project including (a) the socioeconomic dimensions of the site selection process, (b) the involvement of the public, (c) incentives, (d) socioeconomic impacts and (d) the unique characteristics of Pennsylvania's institutional infrastructure, and (2) Technical aspects of the project including (a) technical criteria review and development, (b) a Pennsylvania geology screening study, and (c) the development of technical concepts for the determination of site characteristics. The results of these integrated analyses are incorporated into several options for decision makers to create a plan for the Commonwealth regarding the social and technical facets of the selection, development and operation of a LLRW site in Pennsylvania. 28 references, 2 figures, 6 tables. (ERA citation 10:001972)

515,408
DE85002333/GAR PC A04/MF A01
Pennsylvania State Univ., University Park. Inst. for Research on Land and Water Resources.
Low Level Radioactive Waste Disposal Siting: A Social and Technical Plan for Pennsylvania. Volume 4. Annotated Bibliography.
G. Aron, R. J. Bord, F. A. Clemente, W. P. Dornsife, and A. R. Jarrett. Sep 84, 70p DOE/LLW-36T-V.4
Contract AC07-76ID01570
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This bibliography is broken down by major topics: engineering, physical sciences, and geology; public participation and attitudes; socioeconomic impacts; and institutional aspects. (ERA citation 10:001975)

515,409
DE85002345/GAR PC A02/MF A01
Los Alamos National Lab., NM.
Compact Approach to Monitored Retrievable Storage of Spent Fuel.
D. W. Muir. Sep 84, 13p LA-10022-MS
Contract W-7405-ENG-36
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Recent federal waste-management legislation has raised national interest in monitored retrievable storage (MRS) of unprocessed spent fuel from civilian nuclear power plants. We have reviewed the current MRS design approaches, and we have examined an alternative concept that is extremely compact in terms of total land use. This approach may offer substantial advantages in the areas of monitoring and in safeguards against theft, as well as in reducing the chances of groundwater contamination. Total facility costs are roughly estimated and found to be generally competitive with other MRS concepts. 4 references, 3 figures, 3 tables. (ERA citation 10:001966)

515,410
DE85002375/GAR PC A02/MF A01
Battelle Pacific Northwest Labs., Richland, WA.
Organic Complexant-Enhanced Mobility of Toxic Elements in Low-Level Wastes.
J. L. Swanson. Aug 84, 20p PNL-SA-12518, CONF-8409115-11
Contract AC06-76RL01830
Annual Low-Level Waste Management Program participants' information meeting, Denver, CO, USA, 11 Sep 1984.

This paper describes the results obtained during the recent activities of a project whose objective is to determine how and to what extent organic complexants affect the mobility of toxic elements in subsurface groundwaters at commercial low-level waste disposal sites. Generic soil components (e.g., hydrous oxides, silica, clays) are being employed so that the results will be broadly applicable. Data have been obtained with two radionuclides (sup 63 Ni and sup 239 Pu) and one nonradioactive toxic element (Cd). Work with sup 63 Ni has been emphasized; it was studied with five different generic soil components (hydrous ferric oxide, silica, titania, kaolinite, and montmorillonite) and five different complexants (EDTA, NTA, picolinate, citrate, and oxalate). EDTA was the complexant studied most extensively and hydrous ferric oxide, Fe sub 2 O sub 3 .xH sub 2 O, was the most studied soil component. A wide diversity of effects of organic complexants on toxic elements sorption was observed. The effects vary not only among complexants, but also among toxic elements and among soil components. In some systems the complexant results in increased toxic element sorption (decreased mobility) while in other systems the complexant results in decreased toxic element sorption (increased mobility). 5 references, 5 figures, 2 tables. (ERA citation 10:002004)

515,411
DE85002376/GAR PC A02/MF A01
Battelle Pacific Northwest Labs., Richland, WA.
In Situ gamma-Ray Spectrometric Analysis of Radionuclide Distributions at a Commercial Shallow Land Burial Site.
L. J. Kirby, and R. M. Campbell. Oct 84, 15p PNL-SA-12113, CONF-841014-1
Contract AC06-76RL01830
International conference on nuclear and radiochemistry, Lindau, Bodensee, F.R. Germany, 8 Oct 1984.

Gamma-ray spectrometric analysis conducted at the Maxey Flats, Kentucky (USA) shallow land burial site confirmed that the waste radionuclides have been retained largely within the restricted area of the burial site. Concentrations of sup 137 Cs and sup 60 Co were comparable with those originating from global fallout and lower than concentrations measured in several other areas having similar rainfall. In-situ spectrometric analyses, corroborated by soil sample and vegetation analyses, indicate that the site has influenced sup 60 Co levels slightly in the west drainage channel, but sup 137 Cs did not originate from the site. Concentrations of sup 60 Co, sup 90 Sr and sup 137 Cs determined in subsurface soils by well logging techniques confirmed that subsurface migration of waste-derived radionuclides to points outside the restricted area has not been a significant source of contamination of the environs adjacent to the site. 8 references, 8 figures. (ERA citation 10:002003)

515,412
DE85002421/GAR PC A02/MF A01
Los Alamos National Lab., NM.
Nondestructive Assay System Development for a Plutonium Scrap Recovery Facility.
S. T. Hsue, and M. P. Baker. 1984, 3p LA-UR-84-3379, CONF-841007-14
Contract W-7405-ENG-36
Nuclear science symposium, Orlando, FL, USA, 31 Oct 1984.

A plutonium scrap recovery facility is being constructed at the Savannah River Plant (SRP). The safeguards groups of the Los Alamos National Laboratory have been working since the early design stage of the facility with SRP and other national laboratories to develop a state-of-the-art assay system for this new facility. Not only will the most current assay techniques be incorporated into the system, but also the various nondestructive assay (NDA) instruments are to be integrated with an Instrument Control Computer (ICC). This undertaking is both challenging and ambitious; an entire assay system of this type has never been done before in a working facility. This paper will describe, in particular, the effort of the Los Alamos Safeguards Assay Group in this endeavor. Our effort in this project can be roughly divided into three phases: NDA development, system integration, and integral testing. 6 references. (ERA citation 10:002017)

515,413
DE85002440/GAR PC A02/MF A01
Sandia National Labs., Albuquerque, NM.
Diffusion of Plutonium in Compacted, Brine-Saturated Bentonite.
E. J. Nowak. 1984, 8p SAND-84-1118C, CONF-841157-9
Contract AC04-76DP00789
Symposium on the scientific basis for nuclear waste management, Boston, MA, USA, 26 Nov 1984.
Portions are illegible in microfiche products.

Diffusivities were measured for plutonium in brine-saturated compacted Wyoming bentonite. Complexities of the solution chemistry and retardation of transuranics necessitate diffusion studies under conditions that are specific for repository host rock types, in this case salt. Diffusivity values in the range of 10 exp -15 to 10 exp -14 m exp 2 /s were obtained for bentonite at a packing density of 1800 kg/m exp 3 . That density was obtained by compaction at 15 MPa, a typical lithostatic pressure in a repository in salt at 650 m depth. Even a 0.05-m (2 inch) thick bentonite-containing engineered barrier could decrease radionuclide release rates by approximately 4 orders-of-magnitude if the diffusivity for that radionuclide were in the observed range of 10 exp -15 to 10 exp -14 m exp 2 /s. These results confirm the effectiveness of uncompacted bentonite-containing materials as engineered barriers for radioactive waste isolation. 23 references, 2 figures, 1 table. (ERA citation 10:002006)

515,414
DE85002502/GAR PC A04/MF A01
Rockwell International, Richland, WA. Rockwell Hanford Operations.
Closeout Report for the Decontamination and Decommissioning of the 203-S, 204-S, 205-S Facilities.
O. R. Rasmussen. Sep 84, 55p RHO-RE-SR-37-P
Contract AC06-77RL01030

The obsolete 203-S, 204-S, 205-S uranium nitrate hexahydrate purification and storage facility and the radioactive waste tank car unloading equipment in the 200 West Area of the US Department of Energy Hanford Site were decontaminated and decommissioned. Aboveground facilities were dismantled and the area was backfilled with a minimum of 2 feet of clean fill over remaining underground concrete structures and piping. Fencing was removed and the site was released as a clean area with underground contamination. The 13-month project was completed by Rockwell Hanford Operations' new Decontamination and Decommissioning forces three months ahead of schedule and $275,000 under budget. 46 figures. (ERA citation 10:001984)

515,415
DE85002656/GAR PC A03/MF A01
Geological Survey, Denver, CO.
Geological and Geophysical Evidence of Structures in Northwest-Trending Washes, Yucca Mountain, Southern Nevada, and Their Possible Significance to a Nuclear Waste Repository in the Unsaturated Zone.
R. B. Scott, G. D. Bath, V. J. Flanigan, D. B. Hoover, and J. G. Rosenbaum. 1984, 27p USGS-OFR-84-567
Contract AI08-78ET44802

Geological and geophysical evidence suggests that five prominent linear northwest-trending washes in the northeastern part of Yucca Mountain, Nevada, are underlain by zones of right-lateral strike-slip faults. Northwest-striking faults exposed along the washes are nearly vertical, have essentially horizontal striations on slickensides, and have small vertical offsets. Cores from drill holes within Drill Hole Wash contain northwest-striking steeply dipping fault and fracture planes. Higher conductances and lower resistivities in zones within Drill Hole Wash are interpreted as zones of fractured rocks that are more highly altered or contain more water than adjacent, less fractured rocks. Little measurable horizontal offset of geomorphic features has occurred along these strike-slip faults, and strike-slip motion was probably small, even along the longest of these faults. The strikes, sense of motion, geographic position, and age of these Yucca Mountain strike-slip faults are similar to those of the regional Walker Lane-Las Vegas Valley shear zones. Strike-slip faults in the northeastern part of Yucca Mountain will affect the stability of mined openings of the potential high-level nuclear waste repository at Yucca Mountain where brecciated or highly fractured zones are encountered. Because the repository is planned above the water table in unsaturated rocks, such faults may be favorable features where they allow recharge to drain rapidly from the repository. However, at greater depths these faults may be adverse features where they provide potential hydrologic conduits through unsaturated sorptive zeolitized nonwelded tuffs below the repository and within rocks below the water table in the saturated zone. Although these potentially favorable and adverse factors must be investigated and evaluated, present information does not rule out extension of the repository into the area northeast of Drill Hole Wash. (ERA citation 10:001985)

515,416
DE85002671/GAR PC A04/MF A01
Battelle Pacific Northwest Labs., Richland, WA.
In Situ Vitrification Pilot-Scale Radioactive Test.
C. L. Timmerman, and K. H. Oma. Oct 84, 65p PNL-5240
Contract AC06-76RL01830

Pacific Northwest Laboratory (PNL) is developing in situ vitrification (ISV) as an in-place stabilization technique for selected liquid radioactive waste disposal sites. The process melts the wastes and surrounding soil to produce a durable glass and crystalline waste form. These ISV process development testing and evaluation studies are being conducted for the US Department of Energy. The results of an ISV pilot-scale test conducted in June of 1983 in which soils contaminated with actual radioactive transuranic and mixed fission product elements were vitrified are discussed. The primary objectives of the radioactive test were to: demonstrate containment and confinement of the radioactive material; verify equipment performance of the power and off-gas systems; identify losses to the off-gas system; and characterize the behavior of the radioactive material in the vitrified soil. The test successfully demonstrated the processing containment of radionuclides both within the vitrified mass and in the off-gas system. No environmental release of radioactive material was measured during testing operations. The vitrified soil had a greater than 99% retention of all radionuclides. Losses to the off-gas system varied from less than or equal to 0.03% for particulate materials (plutonium and strontium) to 0.8% for cesium

which is a more volatile element. The off-gas system effectively contained both volatile and entrained radioactive materials. Analysis of the vitrified soil revealed that all radionuclides were distributed throughout the vitrified zone, some more uniformly than others. No migration of radionuclides outside the vitrification zone occurred, as indicated by analysis of soil samples from around the block. Previous waste form leaching studies indicate an acceptable durability of the ISV product. 8 references, 34 figures, 8 tables. (ERA citation 10:001979)

515,417

DE85900002/GAR PC **A02**
UKAEA, Winfrith (England). Atomic Energy Establishment.
Method of Final Conditioning of Solid Radioactive Wastes.
F. W. Ledebrink. 18 Feb 82, 6p WH-Trans-513
Translation of German Patent Application 0,032,686, 1981.
Paper copy only, copy does not permit microfiche production.

Organic raw wastes are finely reduced, mixed homogeneously into a cement/water mix, poured into a storage drum, and any non-reducible wastes of an inorganic nature embedded, therein. The cured wastes are transported to the repository. (ERA citation 10:004390)

515,418

NUREG/CR-3752/GAR PC **A04/MF A01**
Battelle Pacific Northwest Labs., Richland, WA.
Effects of Hydrologic Variables on Rock Riprap Design for Uranium Tailings Impoundments,
W. H. Walters, and R. L. Skaggs. Jan 85, 63p PNL-5069

Pacific Northwest Laboratory is studying the mitigation of erosion of earthen radon suppression covers for uranium tailings impoundments. Because the covers will require erosion protection for upwards of 1000 years, rock riprap (armoring) has been proposed as the primary protection method. This study investigates the sensitivity of riprap design procedures to extreme flood events that can generate high flow velocities and shear stresses. The study uses two decommissioned tailings sites (Grand Junction and Slick Rock, Colorado) as case studies to evaluate the sensitivity of design rock size with respect to variables such as flood discharge, side slope, specific gravity, safety factor, and channel roughness. The results indicate that design rock size can vary significantly for different design procedures.

515,419

NUREG/CR-3851-V3/GAR PC **A03/MF A01**
Oak Ridge National Lab., TN.
Progress in Evaluation of Radionuclide Geochemical Information Developed by DOE (Department of Energy) High-Level Nuclear Waste Repository Site Projects: Report for April-June 1984.
Quarterly progress rept.,
A. D. Kelmers, W. D. Arnold, R. E. Meyer, F. J. Smith, and G. K. Jacobs. Jan 85, 39p ORNL/TM-9191/V3
See also NUREG/CR-3851-V2.

Geochemical information relevant to the retention of radionuclides by candidate high-level waste repositories being developed by Department of Energy (DOE) projects is being evaluated. During this report period, the project has evaluated radionuclide sorption and solubility values applicable to the candidate repository site in the Columbia River basalts at the Hanford Reservation. The removal of technetium from pertechnetate-traced groundwater by McCoy Canyon basalt under anoxic redox conditions was found to be sensitive to the groundwater composition. Sorption of uranium from groundwater by McCoy Canyon basalt under oxic redox conditions showed low sorption ratios similar to those previously obtained. The average sorption ratio for strontium in groundwater onto McCoy Canyon basalt under oxic redox conditions was 225 L/kg.

515,420

NUREG/CR-4056/GAR PC **A02/MF A01**
EG and G Idaho, Inc., Idaho Falls.
Particulate and Gas Release from Light-Water-Reactor (LWR) Fuel Rods Stored in Inert and Dry Air Atmospheres.
Rept. for Aug 82-Dec 84,
C. S. Olsen. Dec 84, 23p EGG-2359
Contract DE-AC07-76IDO1570

A testing program using eight commercial pressurized-water-reactor (PWR) and boiling-water-reactor (BWR) spent fuel rods was conducted to investigate their long-term stability under a variety of possible dry storage conditions. The objective of this project is to provide the Nuclear Regulatory Commission (NRC) with information to confirm or establish licensing positions for dry spent fuel rod storage with regard to long-term, low-temperature, spent fuel rod behavior during dry storage and radioactive contamination arising from spallation of cladding crud. The results of the analyses of the crud, fuel particulate, and gas release from these eight fuel rods is presented, which includes weight change measurements, delayed neutron measurements, and isotopic analysis of smears used to assess the particulate release. Gas analyses of the fuel rod capsule environments were made to determine the fission gas release, and flow tests were performed to determine the extent of filter blockage from particle entrapment.

18H. Radioactivity

515,421

DE84014730/GAR PC **A02/MF A01**
Argonne National Lab., IL.
Steady-State and Transient Fission Gas Release and Swelling Model for LIFE-4.
A. Villalobos, Y. Y. Liu, and J. Rest. Jun 84, 5p
CONF-841105-23-Abst.
Contract W-31-109-ENG-38
Joint meeting of the American Nuclear Society and the Atomic Industrial Forum, Washington, DC, USA, 11 Nov 1984.

The fuel-pin modeling code LIFE-4 and the mechanistic fission gas behavior model FASTGRASS have been coupled and verified against gas release data from mixed-oxide fuels which were transient tested in the TREAT reactor. Design of the interface between LIFE-4 and FASTGRASS is based on an earlier coupling between an LWR version of LIFE and the GRASS-SST code. Fission gas behavior can significantly affect steady-state and transient fuel performance. FASTGRASS treats fission gas release and swelling in an internally consistent manner and simultaneously includes all major mechanisms thought to influence fission gas behavior. The FASTGRASS steady-state and transient analysis has evolved through comparisons of code predictions with fission-gas release and swelling data from both in- and ex-reactor experiments. FASTGRASS was chosen over other fission-gas behavior models because of its availability, its compatibility with the LIFE-4 calculational framework, and its predictive capability. (ERA citation 10:002351)

515,422

DE85000005/GAR PC **A04/MF A01**
Colorado State Univ., Fort Collins. Dept. of Radiology and Radiation Biology.
Radioecological Investigations of Uranium Mill Tailings Systems. Fifth Technical Progress Report, October 1, 1983-September 30, 1984.
F. W. Whicker, and S. A. Ibrahim. 15 Oct 84, 51p
DOE/EV/10305-15
Contract AC02-79EV10305
Portions are illegible in microfiche products.

The general intent of this investigation is to quantitatively evaluate the potential release of important radionuclides from active and reclaimed uranium mill tailings and their entry into the food chain. For active mill tailings, we are trying to quantify the degree of escape and dispersal, primarily by wind, and to measure the accumulation of exp 238 U, exp 230 Th, exp 226 Ra, exp 210 Pb and exp 210 Po by various native plants. Of particular interest are the relationships between soil and vegetation at different sites, since the chemical environment of areas impacted by mill tailings are drastically different than undisturbed natural areas. Also of great interest, is the relative importance of various mechanisms of radionuclide accumulation by plants, such as root uptake and aerial deposition, followed by some degree of foliar absorption. This investigation includes as a major component, studies relating to the final disposal of mill tailings. An experimental plot was developed in which a slab of uniform tailings was covered with various depths of earthen materials and seeded with native range vegetation. Experiments on radon flux versus overburden depth have been conducted and continuing studies are planned. The influence of overburden depth on uptake of radionuclides by native plants is also under study. Work relating to the ability of roots to penetrate tailings or to function near a soil-tailings interface is being carried out. Data on the effect of barium chloride treatment of uranium ore indicate significant reduction of the exp 222 Rn emanation fraction in simulated mill tailings and reduced exp 226 Ra leachability. Soil spiked by injecting radionuclides into the root zone of mature sagebrush was used to obtain data on root uptake for exp 226 Ra, exp 210 Pb and exp 210 Po. (ERA citation 10:000318)

515,423

NUREG/CR-3712/GAR PC **A07/MF A01**
Battelle Pacific Northwest Labs., Richland, WA.
Radionuclide Migration in Groundwater - Annual Report for FY 1983.
Final rept.,
J. S. Fruchter, C. E. Cowan, D. E. Robertson, D. C. Girvin, and E. A. Jenne. Dec 84, 135p PNL-5040
See also NUREG/CR-3554.

Staff at Pacific Northwest Laboratory for the past several years have been collecting the available data concerning radionuclide migration in the groundwater at a low-level disposal site and studying the physicochemical processes that control the mobility of radionuclides in the groundwater. This report summarizes the results obtained and progress made during FY83.

515,424

NUREG/CR-3830-V2/GAR PC **A03/MF A01**
Oak Ridge National Lab., TN.
Aerosol Release and Transport Program Semiannual Progress Report for April 1984-September 1984,
R. E. Adams, and M. L. Tobias. Dec 84, 49p ORNL/TM-9217/V2
Contract DE-AC05-84OR21400
See also NUREG/CR-3830-V1.

Topics discussed include (1) the experimental program in the Fuel Aerosol Simulant Test Facility, (2) NSPP experiments involving an aerosol of limestone-aggregate concrete in a steam-air atmosphere, (3) revisions in the NSPP experimental program, (4) experiments relating to NSPP thermohydraulic conditions, (5) aerosol-moisture interaction test plans, (6) aerosol code implementation activities, (7) improvements in data processing procedures for NSPP experiments, and (8) a study comparing in-vessel and ex-vessel cascade impactor aerosol size measurements in the NSPP.

515,425

NUREG/CR-3994/GAR PC **A07/MF A01**
EG and G Idaho, Inc., Idaho Falls.
BURYIT/ANALYZ: A Computer Package for Assessment of Radiological Risk of Low-Level Radioactive Waste Land Disposal. User's Manual,
J. E. Fisher, N. D. Cox, and C. L. Atwood. Nov 84, 137p EGG-2345
Contract DE-AC07-76IDO1570

This report is a user's manual for a partially completed code for risk assessment of a low-level waste shallow-land burial site, to be used in the licensing of burial sites. This code is intended as a tool to be used for considering nuclide transport mechanisms, including atmospheric, groundwater, erosion, and infiltration to an underlying aquifer. It also calculates doses to individuals and the population through direct exposure, inhalation, and ingestion. The methodology of the risk assessment is based primarily on the response surface method of uncertainty analysis. An example is given using the atmospheric transport pathway as modeled by a code called BURYIT. The framework for using other release pathways is described in this manual. Information on parameter uncertainties, reference site characteristics, and probabilities of release events is included.

515,426

WINDSCALE-TRANS-849/GAR PC **A02/MF A01**
UKAEA, Windscale (England). Nuclear Power Development Labs.

Influence of Water Droplets from a Cooling Tower Vapour Cloud on the Deposition of Radioactive Compounds from Waste Plumes from Nuclear Power Stations.
P. Brog. 1978, 6p
A pp 1075-1079 of Reactor Congress Hannover Section 8, Reactor and Energy Systems problems of economy (1978).
U.S. Sales Only.

Vapour clouds from cooling towers contain in their visible part condensation droplets which rarely exceed a total quantity of 3g/m exp 3 . The diameter of these droplets is on average 10 mu m. They can only reach the ground if they are trapped by coalescence with raindrops passing through the cloud and entrained in their downward path. If the radioactive waste air plume becomes mixed with the visible part of the vapour cloud from the cooling tower, the condensation droplets can easily acquire radioactive contamination, resulting during rainy weather in a deposition of radioactive emissions from the chimney, the level of which will vary appreciably from that obtained without any mixing of the waste air plume with the vapour cloud. Some of the drops of spray emitted by the cooling tower may also reach the ground in view of their greater size (up to a few 100 mu m). They will only have a radioactive content, if they pass through the waste air plume. (Atomindex citation 11:569842)

18I. Reactor Engineering and Operation

515,427
DE84007301/GAR PC **A02**/MF **A01**
Argonne National Lab., IL.
Leakage-Flow-Induced Vibration of a Tube-in-Tube Slip Joint.
T. M. Mulcahy. 1984, 14p CONF-841201-3
Contract W-31-109-ENG-38
ASME winter annual meeting, New Orleans, LA, USA, 9 Dec 1984.

The susceptibility of a cantilevered tube conveying water to self-excitation by leakage flow through a slip joint is assessed experimentally. The slip joint is formed by inserting a smaller, rigid tube into the free end of the cantilevered tube. Variations of the slip joint annular gaps and engagement lengths are tested, and several mechanisms for self-excitation are described. (ERA citation 10:002302)

515,428
DE84009630/GAR PC **A02**/MF **A01**
Argonne National Lab., IL.
Unprotected Loss-of-Heat Sink Simulation in the EBR-II Plant.
E. E. Feldman, and D. Mohr. 1984, 21p CONF-841201-6
Contract W-31-109-ENG-38
ASME winter annual meeting, New Orleans, LA, USA, 9 Dec 1984.
Portions are illegible in microfiche products.

Two unprotected loss-of-heat sink transients initiated from near full power conditions in the Experimental Breeder Reactor-II (EBR-II) plant have been simulated. In one transient the secondary sodium flow is reduced to nearly zero (0.5% of its initial value) while in the other the flow simply coasts down to a natural-convective rate of about 8%. In spite of the large difference in primary heat removal rates, which the difference in secondary flow rates represents, both transients have very similar overall behavior. In addition, the large volume of sodium in the primary tank causes a slowly rising tank temperature in response to net heat addition. An important result is that the negative reactivity feedback characteristics of the reactor cause it to shut itself down in a benign manner in both cases. Experiments based on these simulations are planned for the EBR-II in 1985. (ERA citation 10:002356)

515,429
DE84013162/GAR PC **A05**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Pipe-to-Pipe Impact Program.
J. M. Alzheimer, M. C. C. Bampton, J. R. Friley, and F. A. Simonen. Jun 84, 78p PNL-4954
Contract AC06-76RL01830

This report documents the tests and analyses performed as part of the Pipe-to-Pipe Impact (PTPI) Program at the Pacific Northwest Laboratory. This work was performed to assist the NRC in making licensing decisions regarding pipe-to-pipe impact events following postulated breaks in high energy fluid system piping. The report scope encompasses work conducted from the program's start through the completion of the initial hot oil tests. The test equipment, procedures, and results are described, as are analytic studies of failure potential and data correlation. Because the PTPI Program is only partially completed, the total significance of the current test results cannot yet be accurately assessed. Therefore, although trends in the data are discussed, final conclusions and recommendations will be possible only after the completion of the program, which is scheduled to end in FY 1984. (ERA citation 10:002395)

515,430
DE84014535/GAR PC **A02**/MF **A01**
Argonne National Lab., IL.
Fuel and Control Rod Failure Behavior During Degraded Core Accidents.
K. S. Chung. 1984, 4p CONF-841105-16
Contract W-31-109-ENG-38
Joint meeting of the American Nuclear Society and the Atomic Industrial Forum, Washington, DC, USA, 11 Nov 1984.
Portions are illegible in microfiche products.

As a part of the pretest and posttest analyses of Light Water Reactor Source Term Experiments (STEP) which are conducted in the Transient Reactor Test (TREAT) facility, this paper investigates the thermodynamic and material behaviors of nuclear fuel pins and control rods during severe core degradation accidents. A series of four STEP tests are being performed to simulate the characteristics of the power reactor accidents and investigate the behavior of fission product release during these accidents. To determine the release rate of the fission products from the fuel pins and the control rod materials, information concerning the timing of the clad failure and the thermodynamic conditions of the fuel pins and control rods are needed to be evaluated. Because the phase change involves a large latent heat and volume expansion, and the phase change is a direct cause of the clad failure, the understanding of the phase change phenomena, particularly information regarding how much of the fuel pin and control rod materials are melted are very important. A simple energy balance model is developed to calculate the temperature profile and melt front in various heat transfer media considering the effects of natural convection phenomena on the melting and freezing front behavior. (ERA citation 10:002348)

515,431
DE84014685/GAR PC **A02**/MF **A01**
Argonne National Lab., IL.
Methodology for Validation of Safety Parameters and Fault Identification.
C. P. Tzanos. 1984, 5p CONF-841105-17
Contract W-31-109-ENG-38
Joint meeting of the American Nuclear Society and the Atomic Industrial Forum, Washington, DC, USA, 11 Nov 1984.
Portions are illegible in microfiche products.

The reliability of plant control and protection is strongly dependent on the reliability of the plant instrumentation system. The experience from the operation of nuclear power plants has shown that erroneous and contradictory instrument signals confuse the operator and delay corrective action. The same experience has also shown that about 10% of the total unplanned shutdowns are due to instrument failures. Plant safety as well as plant availability can be enhanced by improving the reliability of instrument information. A methodology has been deveoped that provides validation of safety-significant plant parameter measurements, plant state verification, and fault identification in the presence of many instrumentation failures (including multiple common-cause failures). This paper presents the basic features of this methodology and some results of its application to a reference LMFBR plant. (ERA citation 10:002271)

515,432
DE84014734/GAR PC **A02**/MF **A01**
Argonne National Lab., IL.
Analytical Formula for Fuel Particle to Liquid Sodium Heat Transfer.
1984, 7p CONF-841105-24
Contract W-31-109-ENG-38
Joint meeting of the American Nuclear Society and the Atomic Industrial Forum, Washington, DC, USA, 11 Nov 1984.

In the analysis of unprotected loss-of-flow and overpower transients of liquid metal fast breeder reactors, the modeling of heat transfer from molten fuel, ejected into the coolant channel after cladding rupture, to liquid sodium is an important part of fuel-coolant interaction (FCI). Some of the ejected molten fuel fragments into small particles and gets dispersed in the coolant. In the PLUT02 code model and other modeling efforts of FCI it is assumed that the fuel particle to liquid sodium heat transfer is limited only by the thermal conduction resistance of the fuel because the thermal conductivity of liquid sodium is about 30 times higher than that of mixed oxide. The fuel particle (assumed to be a sphere) surface temperature, under this assumption, equals the coolant temperature. The purpose of the present analysis is to obtain the value of meter C sub 1 (for V/sub I/ = 1) by solving the linear transient heat conduction equation a constant parameter in the equation for evaluating the fuel-coolant heat transfer coefficient. (ERA citation 10:002352)

515,433
DE84015828/GAR PC **A02**/MF **A01**
Argonne National Lab., IL.
Integral Fast Reactor Concept.
Y. I. Chang, J. F. Marchaterre, and R. H. Sevy. 1984, 5p CONF-841105-32
Contract W-31-109-ENG-38
Joint meeting of the American Nuclear Society and the Atomic Industrial Forum, Washington, DC, USA, 11 Nov 1984.

Key features of the IFR consist of a pool-type plant arrangement, a metal fuel-based core design, and an integral fuel cycle with colocated fuel cycle facility. Both the basic concept and the technology base have been demonstrated through actual integral cycle operation in EBR-II. This paper discusses the inherent safety characteristics of the IFR concept. (ERA citation 10:002353)

515,434
DE84017381/GAR PC **A02**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Thermal-Hydraulic Uncertainties Affecting Severe Accident Progression.
F. E. Haskin, and V. L. Behr. 1984, 14p SAND-84-1916C, CONF-841195-1
Contract AC04-76DP00789
International post accident heat removal conference, Los Angeles, CA, USA, 7 Nov 1984.

To provide the proper technical bases for decisions regarding severe accidents, the US Nuclear Regulatory Commission (NRC) is sponsoring the following activities: (a) a variety of severe accident research programs, combined under the Severe Accident Research Plan; (b) nationwide task forces on containment loading, containment response, and fission product source terms; (c) a review by the American Physical Society of state-of-the-art methods for calculating radiological source terms; and (d) technical exchange meetings with the Industry Degraded Core (IDCOR) program. One of the means for integrating this developing array of technical information is the Severe Accident Risk Reduction Program (SARRP). One of the current SARRP objectives is to utilize insights gained from the activities listed above to characterize the relative likelihoods of competing containment failure modes for core-melt accidents. (ERA citation 10:002400)

515,435
DE84770496/GAR PC **A06**/MF **A01**
Erlangen-Nuernberg Univ. (Germany, F.R.). Technische Fakultaet.
Theoretical and Experimental Investigations on the Fluid-Structure-Interactions in an Oscillation Model of a Pressurized Water Reactor.
Diss. (Dr.-Ing.),
P. Schulz. 27 Sep 82, 113p NP-4770496
In German.
U.S. Sales Only. Portions are illegible in microfiche products.

As in Pressurized Water Reactors the core container is not accessible to direct measurements within the frame of the oscillation control, the oscillation behavior of the core container must be determined via control points accessible from outside by means of a computation model. The theories formulated for wide and long annular gaps for the calculation of the water mass oscillating in resonance lead by application on the short and narrow annulus of a PWR to unrealistically

high oscillating water masses. A new theory was developed for the short and narrow annulus under the assumptions that the radial flow component and the radial dependency of both other flow components are negligible. The Laplace equation for potential flow is solved to give the displacement flow caused by the oscillation. For the calculation of the fundamental frequencies of the PWR model, a calculation model composed of rigid bodies and springs was used. By stagment oscillation tests in air and water as well as by flow tests, the theory was validated. The problems arising from the scaling-up by means of the theory to full scale are discussed. (ERA citation 10:000561)

515,436
DE85000175/GAR PC A02/MF A01
Los Alamos National Lab., NM.
Interfacing Systems Loss-of-Coolant Accident in Oconee-1 Pressurized Water Reactor.
B. Nassersharif. 1984, 19p LA-UR-84-3284, CONF-8410142-21
Contract W-7405-ENG-36
12. water reactor safety research information meeting, Gaithersburg, MD, USA, 23 Oct 1984.
Portions are illegible in microfiche products.

The primary system of a pressurized water reactor (PWR) operates at a relatively high pressure (15.5 MPa, 2250 psia) and consists of piping and components designed to withstand these pressures. The low-pressure-injection system (LPIS) connects to the primary system but possesses low-pressure piping passing outside the containment. Therefore, a potential exists for a loss-of-coolant accident (LOCA) outside the containment and concurrent damage to systems needed to cope with this problem. The emergency core-cooling system (ECCS) is assumed to be available for this event. A set of calculations were performed using the TRAC-PF1 code and a model of the Oconee-1 PWR to investigate the consequences of, and possible operator actions for, such an accident scenario. (ERA citation 10:002368)

515,437
DE85001069/GAR PC A02/MF A01
Hanford Engineering Development Lab., Richland, WA.
Application of the Pulsed Magnetic Welding Process to Nuclear Breeder Reactor Fuel Pin End Closures.
W. F. Brown. 1984, 6p HEDL-7500
Contract AC06-76FF02170
Portions are illegible in microfiche products.

The pulsed magnetic welding process is a solid state welding process in which metallurgical bonding is effected by impacting metal or alloy parts against each other at high velocity by use of controlled high frequency, high intensity pulsed magnetic fields. This process is similar to the explosive welding process except that magnetic energy is used for impacting the parts together instead of using explosive energy. The pulsed magnetic welding (PMW) process is readily applied to the welding of cylindrical plugs to small diameter tubes. Although breeder reactor fuel pin design may vary in size, the application described here consisted of cladding tubes approximately 6.4 mm in diameter by 244 cm long with a wall thickness of 0.38 mm. After the cladding tubes are filled with fuel pellets and associated metal hardware, tapered end plugs are inserted into the end of the tubes and welded. A typical setup for PMW is described. (ERA citation 10:002272)

515,438
DE85001135/GAR PC A02/MF A01
Tennessee Univ., Knoxville.
Data Acquisition and Control System for the K/sub 1C/-HSST Experiments at the ORR.
L. F. Miller, and R. W. Hobbs. 1984, 8p CONF-840902-7
Contract AC05-84OR21400
ASTM-Euratom symposium on reactor dosimetry, Geesthacht, F.R. Germany, 24 Sep 1984.
Portions are illegible in microfiche products.

Major components and primary functions of the process control system for the K/sub 1C/-HSST irradiation experiments at the Oak Ridge Research (ORR) are described. Information relative to methodology for integrating unique features of the Digital Equipment Corporation's RSX-11M Operating System with analog-to-digital and digital-to-analog hardware is presented. In particular, data flow among various real-time applications programs relative to system hardware is presented. General features of the temperature control algorithm are presented, and results that illustrate the spatial temperature distribution in the capsule achieved by the control system are included. (ERA citation 10:002323)

515,439
DE85001176/GAR PC A02/MF A01
Bonneville Power Administration, Portland, OR.
BPA (Bonneville Power Administration) Review of Washington Public Power Supply System, Projects 1 and 3 (WNP 1 and 3): Construction Schedule and Financing Assumptions. Draft Study Report, Part 1.
24 Sep 84, 19p DOE/BP-320-Pt.1

This Draft Study Report is divided into two parts. Part 1 contains a summary of this tudy background, tentative conclustions and recommendations, and a discussion of future assessment of WNP 1 and 3. Part 2 contains an explanation of the resource, rates, and financial analyses performed, related material, and a bibliography of sources used in the study. (ERA citation 10:000539)

515,440
DE85001215/GAR PC A02/MF A01
Hanford Engineering Development Lab., Richland, WA.
FFTF Fuel Assembly Outlet Temperature Measurements and Comparison to Predictions.
E. R. Cramer. Jun 84, 16p HEDL-SA-3161, CONF-840722-2
Contract AC06-76FF02170
Specialist meeting on liquid metal thermal hydraulics in core, plena and pipes, Richland, WA, USA, 31 Jul 1984.
Portions are illegible in microfiche products.

The data from the FFTF core outlet thermocouples have been valuable in verifying the performance of the core assemblies. The data have been useful to the experimental program and as an aid in understanding some reactor operating phenomena. The thermocouple reliability and repeatability have been good. Almost all of the fueled positions in the core have 3 operable thermocouples and every position has at least one. Differences between the measured assembly outlet temperatures and the calculated outlet temperatures have generally been small. Where significant differences have occurred, an explanation has been found. The difference between the measured and calculated outlet temperatures for each assembly remains constant during the cycle. (ERA citation 10:002326)

515,441
DE85001510/GAR PC A02/MF A01
Babcock and Wilcox Co., Lynchburg, VA. Utility Power Generation Div.
400-MWe Consolidated Nuclear Steam System (CNSS). Conceptual Design. Executive Summary.
Jul 83, 10p ORNL/Sub-82-17456/2
Contract AC05-84OR21400
Portions are illegible in microfiche products. Original copy available until stock is exhausted.

There are a number of small nuclear unit concepts under active study. These include the Process Inherent Ultimate Safety (PIUS) unit and a smaller version of the High-Temperature Gas-Cooled Reactor (HTGR). This study has focused on the Consolidated Nuclear Steam System (CNSS) plant concept. Studies performed by The Babcock and Wilcox Company (B and W) and United Engineers and Constructors (UE and C) starting in 1974 have led to a 400 MW PWR CNSS plant concept of compact design. Recent economic studies for the CNSS plant show that it offers economic advantages for electric power generation in certain situations. This executive summary presents the results of these studies. (ERA citation 10:002253)

515,442
DE85001530/GAR PC A03/MF A01
Brookhaven National Lab., Upton, NY.
Isolation Valves of Steam Generators (Hopkinsons Valves) - Broken Bolts. Evaluation Report.
1984, 30p BNL-tr-1038
Contract AC02-76CH00016
Translation of D 5151/R 80 581, August 4, 1980.
Portions are illegible in microfiche products.

The breaks and fissures observed on the bolts of the Hopkinsons valves are a result of stress corrosion that produced embrittlement of the metal by diffusion of hydrogen in a sulfur-containing medium. This was probably caused by decomposition of the molybdenum disulfide lubricant used during installation of the bolts. Moreover, the increased resistance of this material (Rm greater than or equal to 1000 MPa) substantially increased the sensitivity to hydrogen embrittlement. (ERA citation 10:002257)

515,443
DE85001738/GAR PC A02/MF A01
Oak Ridge National Lab., TN.
2240-MW(TH) High-Temperature Reactor Core Power Density Study.
D. R. Vondy. Sep 84, 24p ORNL/TM-9099
Contract AC05-84OR21400

This study was done to estimate the effects of reducing the design power density of a 2240-MW(t) high-temperature gas-cooled reactor. Core history and thermal hydraulics calculations were performed for average power densities of 5.8 and 7.2 W/cm exp 3 and the use of highly enriched fuel was considered. The fuel temperature conditions for the higher power density were found to be only moderately elevated at normal operating conditions. Economic considerations associated with changes in core performance, core size, and coolant pumping requirements were assessed. (ERA citation 10:002260)

515,444
DE85002236/GAR PC A02/MF A01
Hanford Engineering Development Lab., Richland, WA.
Standardized Physics-Dosimetry for US Pressure Vessel Cavity Surveillance Programs.
F. H. Ruddy, W. N. McElroy, E. P. Lippincott, L. S. Kellogg, and R. Gold. 1984, 15p HEDL-SA-3095-FP, CONF-840902-16
Contract AC06-76FF02170
ASTM-Euratom symposium on reactor dosimetry, Geesthacht, F.R. Germany, 24 Sep 1984.
Portions are illegible in microfiche products.

Standardized Physics-Dosimetry procedures and data are being developed and tested for monitoring the neutron doses accumulated by reactor pressure vessels (PV) and their support structures. These procedures and data are governed by a set of 21 ASTM standard practices, guides, and methods for the prediction of neutron-induced changes in light water reactor (LWR) PVs and support structure steels throughout the service life of the PV. This paper summarizes the applications of these standards to define the selection and deployment of recommended dosimetry sets, the selection of dosimetry capsules and thermal neutron shields, the placement of dosimetry, the methods of measurement of dosimetry sensor reaction products, data analysis procedures, and uncertainty evaluation procedures. It also describes the validation of these standards both by in-reactor testing of advanced PV cavity surveillance physics-dosimetry and by data development. The use of these standards to guide selection and deployment of advanced dosimetry sets for commercial reactors is also summarized. (ERA citation 10:002240)

515,445
DE85002412/GAR PC A02/MF A01
Los Alamos National Lab., NM.
Los Alamos Nuclear Plant Analyzer: An Interactive Power-Plant Simulation Program.
R. Steinke, C. Booker, P. Giguere, D. R. Liles, and J. H. Mahaffy. 1984, 16p LA-UR-84-3318, CONF-8410142-18
Contract W-7405-ENG-36
12. water reactor safety research information meeting, Gaithersburg, MD, USA, 23 Oct 1984.
Portions are illegible in microfiche products.

The Nuclear Plant Analyzer (NPA) is a computer-software interface for executing the TRAC or RELAP5 power-plant systems codes. The NPA is designed to use advanced supercomputers, long-distance data communications, and a remote workstation terminal with interactive computer graphics to analyze power-plant thermal-hydraulic behavior. The NPA interface simplifies the running of these codes through automated procedures and dialog interaction. User understanding of simulated-plant behavior is enhanced through graphics displays of calculational results. These results are displayed concurrently with the calculation. The user has the capability to override the plant's modeled control system with hardware-adjustment commands. This gives the NPA the utility of a simulator, and at the same time, the accuracy of an

advanced, best-estimate, power-plant systems code for plant operation and safety analysis. (ERA citation 10:002369)

515,446
DE85002435/GAR PC **A02**/MF **A01**
Los Alamos National Lab., NM.
Guide to Radiological Accident Considerations for Siting and Design of DOE Nonreactor Nuclear Facilities.
J. Elder, and J. M. Graf. 1984, 11p LA-UR-84-3448, CONF-841187-1
Contract W-7405-ENG-36
DOE environmental protection information meeting, Albuquerque, NM, USA, 6 Nov 1984.

DOE Office of Nuclear Safety has sponsored preparation of a guidance document to aid field offices and contractors in their analyses of consequences of postulated major accidents. The guide addresses the requirements of DOE Orders 5480.1A, Chapter V, and 6430.1, including the general requirement that DOE nuclear facilities be sited, designed, and operated in accordance with standards, codes, and guides consistent with those applied to comparable licensed nuclear facilities. The guide includes both philosophical and technical information in the areas of: siting guidelines doses applied to an offsite reference person; consideration also given to an onsite reference person; physical parameters, models, and assumptions to be applied when calculating doses for comparison to siting criteria; and potential accident consequences other than radiological dose to a reference person which might affect siting and major design features of the facility, such as environmental contamination, population dose, and associated public health effects. Recommendations and/or clarifications are provided where this could be done without adding new requirements. In this regard, the guide is considered a valuable aid to the safety analyst, especially where requirements have been subject to inconsistent interpretation or where analysis methods are in transition, such as use of dose model (ICRP 2 or ICRP 30) or use of probabilistic methods of risk analysis in the siting and design of nuclear facilities. (ERA citation 10:002008)

515,447
DE85002459/GAR PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Report of the First United States Conference on Utility Experience with Neutron Noise Analysis.
D. N. Fry, G. P. Horne, and C. W. Mayo. 1984, 9p CONF-841017-6
Contract AC05-84OR21400
Specialists' meeting on reactor noise - SMORN IV, Dijon, France, 15 Oct 1984.
Portions are illegible in microfiche products.

An informal meeting was held in Washington, D.C. on April 3 and 4, 1984, to discuss the current state of the art and experiences with neutron noise analysis in US pressurized water reactors (PWRs). The meeting was attended by 33 persons representing 11 utilities and 3 PWR reactor vendors as well as consultants, universities, and research laboratories. Presentations at the meeting covered several applications of neutron noise for diagnosing such things as vibrations induced by baffle jetting, detection of mechanical degradation of thermal shield supports, and electrical degradation of nuclear instrumentation channels. Twenty-one responses were obtained from a questionnaire circulated to all participants requesting their viewpoints and experiences regarding neutron noise analysis. The meeting participants concluded that a working group on neutron noise analysis should be formed to (1) establish a baseline library of neutron noise data, (2) provide a forum for communicating experiences with neutron noise surveillance, and (3) develop good practices and quality assurance procedures for neutron noise measurement and interpretation. (ERA citation 10:002236)

515,448
DE85002468/GAR PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
In-Core Coolant Flow Monitoring of Pressurized Water Reactors Using Temperature and Neutron Noise.
F. J. Sweeney, B. R. Upadhyaya, and D. J. Shieh. 1984, 8p CONF-841017-8
Contract AC05-84OR21400
Specialists' meeting on reactor noise - SMORN IV, Dijon, France, 15 Oct 1984.
Portions are illegible in microfiche products.

Noise measurements were performed at the Loss-of-Fluid-Test (LOFT) and Sequoyah-1 pressurized water reactors (PWRs) in order to investigate the possibility of inferring in-core coolant velocities from cross-power spectral density (CPSD) phases of core-exit thermocouple and in-core neutron detector signals. These noise measurements were used to investigate the effects of inlet coolant temperature, core flow, reactor power, and random heat transfer fluctuations on the noise-inferred coolant velocities. The effect on the inferred velocities of varying in-core neutron detector and core-exit thermocouple locations was also investigated. Theoretical models of temperature noise were developed, and the results were used to interpret the experimental measurements. Results of these studies indicate that the neutron detector/thermocouple phase is useful for monitoring core flow in PWRs. Results show that the interpretation of the phase between these signals depends on the source of temperature noise, the response times and locations of the sensors, and the neutron dynamics of the reactor. At Sequoyah-1 we found that the in-core neutron detector/core-exit thermocouple phase can be used to infer in-core coolant velocities, provided that the measurements are corrected for the thermocouple response time. (ERA citation 10:002238)

515,449
DE85002469/GAR PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Long-Term Automated Surveillance of a Commercial Nuclear Power Plant.
C. M. Smith, and R. C. Gonzalez. 1984, 9p CONF-841017-7
Contract AC05-84OR21400
Specialists' meeting on reactor noise - SMORN IV, Dijon, France, 15 Oct 1984.
Portions are illegible in microfiche products.

A pattern recognition system for monitoring nuclear reactor signals is presented. The system is based on detecting deviations from baseline signatures learned automatically during normal plant operation. The capabilities and limitations of the recognition approach were investigated during a 2-1/2-year continuous, on-line series of experiments at the Sequoyah-1 nuclear power plant. (ERA citation 10:002237)

515,450
NUREG/CR-0169-V22/GAR PC **A03**/MF **A01**
EG and G Idaho, Inc., Idaho Falls.
LOFT (Loss-of-Fluid Test) Experimental Measurements Uncertainty Analysis. Volume 22. Fission Product Detection System Instruments Recorded on the DAVDS (Data Acquisition and Visual Display System).
Technical rept.,
R. P. Evans. Dec 84, 29p EGG-2037-VOL-22
Contract DE-AC07-76IDO1570
See also NUREG/CR-0169-V21.

An uncertainty analysis was performed for the Loss-of-Fluid Test Fission Product Instruments recorded on the Data Acquisition and Visual Display System in order to document the accuracy of these channels under steady state operating conditions. In addition, an uncertainty analysis was performed for certain temperature and pressure measurement channels excluding their recording system.

515,451
NUREG/CR-3498/GAR PC **A09**/MF **A01**
Brookhaven National Lab., Upton, NY.
Two-Dimensional Modeling of Intra-Subassembly Heat Transfer and Buoyancy-Induced Flow Redistribution in LMFBRs (Liquid Metal Fast Breeder Reactors).
Technical rept.,
M. Khatib-Rahbar, and E. G. Cazzoli. Jun 84, 176p BNL-NUREG-51713
Contract DE-AC02-76CH00016

Phenomenological models and numerical techniques for prediction of coolant flow and temperature fields during forced, mixed, and free convection regimes of operation in LMFBR subassemblies are addressed. It is shown that, simplified integral solutions provide an excellent approach to assessing the importance of the intra-subassembly buoyancy induced flow redistribution, and the transverse thermal conduction and mixing effects on the assembly wide peak coolant temperatures. Furthermore, a more detailed steady-state and transient parabolic two-dimensional porous-body model, resulting in the TWIST computer code is developed. Comparison of calculated results and out-of-pile sodium and water test data indicate generally good agreement in cross-assembly temperature profiles. However, the impact of fuel pin distortion and bowing, caused by large transverse power gradients on transverse temperature distributions are found to be significant.

515,452
NUREG/CR-3663-V3/GAR PC **A06**/MF **A01**
Lawrence Livermore National Lab., CA.
Probability of Pipe Failure in the Reactor Coolant Loops of Combustion Engineering PWR Plants. Vol. 3. Double-Ended Guillotine Break Indirectly Induced by Earthquakes.
Technical rept.,
M. K. Ravindra, R. D. Campbell, R. P. Kennedy, and H. Banon. Jan 85, 116p UCRL-53500-VOL-3
See also NUREG/CR-3663-V2. Prepared in cooperation with Structural Mechanics Associates, Newport Beach, CA.

The requirements to design the nuclear power plants for the effects of an instantaneous double-ended guillotine break (DEGB) of the reactor coolant loop (RCL) piping have led to excessive design costs, interference of normal plant operation and maintenance personnel. This report describes an aspect of the NRC/Lawrence Livermore National Laboratory sponsored research program aimed at demonstrating that the probability of DEGB in RCL piping of nuclear power plants is acceptably small and the requirements to design for the DEGB effects (e.g., provision of pipe whip restraints) may be removed. This study estimated the probability of indirect DEGB in RCL piping as a consequence of seismic-induced structural failures within the containment of Combustion Engineering supplied pressurized water reactor nuclear power plants in the United States. The median probability of indirect DEGB was estimated to be in the ranges of 10 to the minus 6th power per year for older plants, and less than 10 to the minus 8th power per year for modern plants.

515,453
NUREG/CR-3744-V2/GAR PC **A11**/MF **A01**
Oak Ridge National Lab., TN.
Heavy-Section Steel Technology Program Semiannual Progress Report for April-September 1984,
C. E. Pugh. Dec 84, 245p ORNL/TM-9154/V2
Contract DE-AC05-84OR21400
See also NUREG/CR-3744-V1.

The Heavy-Section Steel Technology (HSST) Program is an engineering research activity conducted by the Oak Ridge National Laboratory for the Nuclear Regulatory Commission. The program comprises studies related to all areas of the technology of materials fabricated into thick-section primary-coolant containment systems of light-water-cooled nuclear power reactors. The investigation focuses on the behavior and structural integrity of steel pressure vessels containing cracklike flaws. Current work is organized into ten tasks: (1) program management, (2) fracture-methodology and analysis, (3) material characterization and properties, (4) environmentally assisted crack growth studies, (5) crack arrest technology, (6) irradiation effects studies, (7) cladding evaluations, (8) intermediate vessel tests and analysis, (9) thermal-shock technology, and (10) pressurized thermal-shock technology.

515,454
NUREG/CR-3794/GAR PC **A03**/MF **A01**
PARAMETER, Inc., Elm Grove, WI.
Closeout of IE Bulletin 80-25: Operating Problems with Target Rock Safety-Relief Valves at Boiling Water Reactors.
Final rept. 31 Aug 82-26 Oct 84,
W. J. Foley, and A. Hennick. Jan 85, 45p PARAMETER/IE-135

As a result of valve failures and nitrogen overpressure events, IE Bulletin 80-25 was issued December 19, 1980 for action to all 30 BWR facilities with operating licenses or near-term operating licenses. Actions were to be taken with respect to (1) all Target Rock two-stage, pilot-operated safety-relief valves (SRVs), (2) any make or model of SRV which fails to function as designed, excepting for pressure set-point requirements and (3) SRV nitrogen/air supply systems. Upon evaluation of utility responses and NRC inspection reports, the bulletin has been closed out for eight of the 30 facilities to which the bulletin was issued for action. For use by NRC/IE, followup items for 22 current facili-

ties with open bulletin status are proposed in Appendix C. Remaining areas of concern and continuing actions dealing with them are described.

515,455
NUREG/CR-3816-V1/GAR PC A06/MF A01
Sandia National Labs., Albuquerque, NM.
Reactor Safety Research Quarterly Report January-March 1984, Volume 29.
Technical rept.
Jan 85, 155p SAND-84-1072-VOL-1
Contract DE-AC04-76DP00789
See also NUREG/CR-3810-V1.

This report describes progress in a number of activities dealing with current safety issues relevant to both light water reactors (LWRs) and breeder reactors. The work includes a broad range of experiments to simulate accidental conditions to provide the required data base to understand important accident sequences and to serve as a basis for development and verification of the complex computer simulation models and codes used in accident analysis and licensing reviews.

515,456
NUREG/CR-3885-V2/GAR PC A02/MF A01
Oak Ridge National Lab., TN.
High-Temperature Gas-Cooled Reactor Safety Studies for the Division of Accident Evaluation Quarterly Progress Report, April 1-June 30, 1984.
S. J. Ball, J. C. Cleveland, R. M. Harrington, C. F. Weber, and J. H. Wilson. Nov 84, 24p ORNL/TM-9267/V2
Contract DE-AC05-84OR21400
See also NUREG/CR-3885-V1.

Modeling, code development, and accident analysis work on the modular High-Temperature Gas-Cooled Reactor (HTGR) systems concentrated on predictions of core and other system temperature histories for postulated long-term loss of forced circulation accidents both with and without system depressurization. Fission-product (FP) release experiments to investigate vapor pressure and diffusion rates through graphite were continued. Experiments with additional elements were conducted.

515,457
NUREG/CR-3936/GAR PC A08/MF A01
Sandia National Labs., Albuquerque, NM.
RELAP5 Assessment: Conclusions and User Guidelines.
Technical rept.,
L. N. Kmetyk. Oct 84, 175p SAND-84-1122
Contract DE-AC04-76DP00789

The RELAP5 independent assessment project at Sandia National Laboratories is part of an overall effort funded by the NRC to determine the ability of various systems codes to predict the detailed thermal/hydraulic response of LWRs during accident and off-normal conditions. The RELAP5/MOD1 code has been assessed at Sandia against a variety of test data from both integral and separate effects test facilities. All these analyses have been documented in detail in individual topical reports; in this paper the overall code performance is evaluated by comparing results from many different calculations. All results show that good primary side steady state initial and/or operating conditions are readily obtained, given adequate facility descriptions and some user experience or guidelines, although problems are usually encountered in the steam generator secondary sides.

515,458
NUREG/CR-4017/GAR PC A03/MF A01
EG and G Idaho, Inc., Idaho Falls.
Interim Criteria for the Use of Programmable Digital Devices in Safety and Control Systems.
Final technical rept.,
D. M. Adams, and J. M. Svoboda. Dec 84, 38p EGG-2348
Contract DE-AC07-76IDO1570

Proposed criteria for the application of stored program, digital computers in commercial nuclear power plants is presented. This report emphasizes recommendations for the design of computer systems and recommends a method for the regulatory review of computer system designs. More restrictive requirements are made for protection systems than control systems or other plant computer systems. The results of this study provide a classification of systems, a recommended design method, and a specification of design issues to be resolved during the design and development of digital computer systems. This report is part of a larger program to research computer system design issues, to develop design criteria (hardware and software) for Safety Parameter Display Systems, to research software quality assurance, to provide a comparative risk assessment of digital technology, and to develop electrical isolation criteria.

515,459
NUREG/CR-4082-V1/GAR PC A06/MF A01
Battelle Columbus Labs., OH.
Degraded Piping Program. Phase 2. Semiannual Report, March 1984-September 1984.
Technical rept. 1 Mar-30 Sep 84,
G. M. Wilkowski, J. Ahmad, C. R. Barnes, D. Broek, and G. Kramer. Jan 85, 125p BMI-2120-VOL-1

The objective of the Degraded Piping Program - Phase II is to develop simple engineering analyses to assess the fracture behavior of nuclear piping. Such analyses must give realistic estimates of actual fracture events. Hence this is an intensely integrated program involving laboratory material property evaluation, analytical developments, and full-scale pipe fracture experiments to verify the simple engineering analyses. Both advance fracture mechanics analyses (i.e., J/T), and limit-load analyses will be assessed.

515,460
NUREG/CR-4115/GAR PC A11/MF A01
EG and G Idaho, Inc., Idaho Falls.
International Standard Problem 13 (LOFT Experiment L2-5) Final Comparison Report.
Technical rept.,
J. D. Burtt. Dec 84, 229p EGG-2369
Contract DE-AC07-76IDO1570

LOFT Experiment L2-5 was designated International Standard Problem 13 by the Organization for Economic Cooperation and Development. Comparisons between measurements from Experiment L2-5 were made with calculations from 11 international participants using five different computer codes. LOFT Experiment L2-5 simulated a double ended guillotine cold leg rupture of a primary coolant loop of a large pressurized water reactor, coupled with a loss of offsite power.

515,461
NUREG-0020-V8-N11/GAR PC A18/MF A01
Nuclear Regulatory Commission, Washington, DC.
Licensed Operating Reactors Status Summary Report: Data as of October 31, 1984.
Nov 84, 404p
See also NUREG-0020-V8-N10.

The report provides data on the operation of nuclear units as timely and accurately as possible. The three sections of the report are: monthly highlights and statistics for commercial operating units, and errata from previously reported data; a compilation of detailed information on each unit, provided by NRC's Regional Offices, IE Headquarters and the utilities; and an appendix for miscellaneous information such as spent fuel storage capability, reactor-years of experience and non-power reactors in the U.S. It is hoped the report is helpful to all agencies and individuals interested in maintaining an awareness of the U.S. energy situation as a whole.

515,462
NUREG-0973/GAR PC A22/MF A01
Nuclear Regulatory Commission, Washington, DC. Office of Nuclear Reactor Regulation.
Technical Specifications for Waterford Steam Electric Station, Unit No. 3, Docket No. 50-382, Appendix A to License No. NPF-26,
D. R. Hoffman. Dec 84, 504p

The Waterford, Unit 3 Technical Specifications were prepared by the U.S. Nuclear Regulatory Commission to set forth the limits, operating conditions, and other requirements applicable to a nuclear reactor facility as set forth in Section 50.36 of 10 CFR Part 50 for the protection of the health and safety of the public.

515,463
NUREG-1061-V4/GAR PC A17/MF A01
Nuclear Regulatory Commission, Washington, DC.
Report of the U.S. Nuclear Regulatory Commission Piping Review Committee. Volume 4. Evaluation of Other Dynamic Loads and Load Combinations.
Dec 84, 383p
See also NUREG-1061-V3.

This report deals with six topical areas: Event Combinations, Response Combinations, Stress Limits and Dynamic Allowables, Water Hammer Loadings, Relief Valve Opening and Closing Loads and Piping Vibration Loads. Foreign information was obtained from sources in Belgium, Canada, France, Italy, Japan, Sweden and the Federal Republic of Germany. In addition, the report contains qualitative value impacts for the proposed recommendations.

515,464
NUREG-1086/GAR PC A05/MF A01
Nuclear Regulatory Commission, Washington, DC. Office of Nuclear Reactor Regulation.
Safety Evaluation Report Related to the Renewal of the Operating License for the Research Reactor at the University of Missouri-Rolla, Docket No. 50-123.
Dec 84, 81p

This Safety Evaluation Report for the application filed by the University of Missouri-Rolla for a renewal of Operating License R-79 to continue to operate a research reactor has been prepared by the Office of Nuclear Reactor Regulation of the U.S. Nuclear Regulatory Commission. The facility is owned by the University of Missouri and is located on the campus in Rolla, Missouri. On the basis of its technical review, the staff concludes that the reactor facility can continue to be operated by the university without endangering the health and safety of the public or the environment.

515,465
NUREG-1107/GAR PC A06/MF A01
Nuclear Regulatory Commission, Washington, DC. Office of Inspection and Enforcement.
RCSLK9: Reactor Coolant System Leak Rate Determination for PWRs (Pressurized Water Reactors). User's Guide.
Technical rept.,
D. C. Kirkpatrick, R. W. Woodruff, and R. A. Holland. Dec 84, 101p
Prepared in cooperation with Nuclear Energy Consultants, Inc., Gaithersburg, MD.

RCSLK9 is a computer program that was developed to analyze the leak tightness of the primary coolant system for any pressurized water reactor. From system conditions, water levels in tanks, and certain system design parameters, RCSLK9 calculates the loss of water from the cooling system and the increase of water in the leakage collection system during an arbitrary time interval. The program determines the system leak rates and displays or prints a report of the results. For initial application of the program at a reactor, RCSLK9 creates a file of system parameters and stores it for future use. RCSLK9 is written for use on the IBM PC.

515,466
PB85-142693/GAR PC A07/MF A01
Massachusetts Inst. of Tech., Cambridge. Energy Lab.
Titan Code Development for Application to a PWR Steam Line Break Accident, 1983-84.
Final rept.,
C. K. Tsai, M. S. Kazimi, and A. F. Henry. Jul 84, 136p MIT/EL-84/014
Sponsored by Long Island Lighting Co., Mineola, NY., Yankee Atomic Electric Co., Boston, MA. and Northeast Utilities Service Co., Hartford, CT.

Modification of the TITAN computer code which enables it to be applied to a PWR steam line break accident has been accomplished. The code now has the capability of simulating an asymmetric inlet coolant temperature transient by employing different temperature transient forcing functions for different core inlet regions. Up to ten regions of the core can be considered and each region can have at most 50 channels. A total inlet coolant mass flow rate boundary condition option has been added to the code. Flow/coolant temperature transient and control rod transient can be simulated simultaneously by the code as necessary for a steam line break accident simulation. Also, the transient restart capability has been fixed which allows users to change core conditions during a transient calculation for various purposes. All these modifications have been tested by a ten-channel test calculation.

515,467
PB85-142735/GAR PC A04/MF A01
Massachusetts Inst. of Tech., Cambridge. Energy Lab.

Disparities in Nuclear Power Plant Performance in the United States and the Federal Republic of Germany.
K. F. Hansen, and D. K. Winje. Dec 84, 70p MIT/EL-84/018
Sponsored by Electric Power Research Inst., Palo Alto, CA.

This report presents data comparing the performance of light water reactors in the United States and the Federal Republic of Germany (FRG). The comparisons are made for the years 1980-1983 and include 21 Westinghouse Pressurized Water Reactors (PWRs), 22 General Electric Boiling Water Reactors (BWRs) in the US; and 6 Kraftwerk Union (KWU) PWRs and 4 KWJ BWRs in the FRG. Data on capacity losses are presented in a disaggregated form for scheduled outages, forced outages, and regulatory imposed outages. Further, within the scheduled and forced outages, the data is subdivided into losses associated with the nuclear island, the balance of plant, or other causes.

515,468
PB85-143188/GAR PC **E04**/MF **E04**
Sussex Univ., Brighton (England). Science Policy Research Unit.
Worldwide Nuclear Plant Performance Revisited: An Analysis of 1978-81 Experience.
Occasional paper series,
S. Thomas. c1982, 58p SPRU/OP/SER-18, ISBN-0-903622-19-X-OP-18
See also PB82-242108.

In this study the operating performance of reactors in the countries with major programs of nuclear reactors (USA, Canada, France, F.R. Germany, Japan, Sweden and UK) are analyzed. In particular the following is identified: the performance levels achieved by fully mature reactors; what differences in performance level exist between reactors of different type, make and size; the influence of the regulatory climate; and the main technical difficulties experienced for each main class of reactor.

515,469
PB85-144236/GAR PC **A10**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Energy Lab.
Loop Simulation Capability for Sodium-Cooled Systems.
Final rept.,
O. A. Adekugbe, A. L. Schor, and M. S. Kazimi. Jul 84, 208p MIT/EL-84/013
Sponsored by Oak Ridge National Lab., TN.

A one-dimensional loop simulation capability has been implemented in the thermal-hydraulic analysis code, THERMIT-4E. The new code, THERMIT-4E/L simulates the entire primary coolant loop and eliminates the need to specify boundary conditions. The additions and modifications to the THERMIT-4E code include: constant temperature heat sinks, implicit heat transfer to environment and generalized body force field specification. To date, applications have been focused on natural circulation. A series of experiments performed in the Sodium Boiling Test Facility (SBTF) at the Oak Ridge National Laboratory have been simulated with the loop code. The results of single-phase calculations are generally in good agreement with the experimental data.

515,470
PB85-144251/GAR PC **A22**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Energy Lab.
Titan: An Advanced Three Dimensional Coupled Neutronic/Thermal-Hydraulics Code for Light Water Nuclear Reactor Core Analysis.
Final rept.,
D. P. Griggs, M. S. Kazimi, and A. F. Henry. Jun 84, 509p MIT/EL-84/011
Sponsored by Long Island Lighting Co., Mineola, NY., Yankee Atomic Electric Co., Boston, MA. and Northeast Utilities Service Co., Hartford, CT.

The accurate analysis of nuclear reactor transients frequently requires that neutronics, thermal-hydraulics, and feedback be included. A number of coupled neutronics/thermal-hydraulics codes have been developed for this purpose. Of these, only a few combine three-dimensional neutronics and thermal-hydraulics, and these are either not generally available or too expensive for many applications of interest. Therefore, TITAN, a coupled code combining state-of-the-art three-dimensional neutronics and thermal-hydraulics models, was developed and tested. The three-dimensional nodal neutronics code QUANDRY and the three-dimensional two-fluid thermal-hydraulics code THERMIT are combined into TITAN. Steady-state and transient coupling methodologies based upon a tandem structure were devised and implemented. Additional models for nuclear feedback, equilibrium xenon and direct moderator heating were added. TITAN was tested using a boiling water two channel problem and the coupling methodologies were shown to be effective. Simulated turbine trip transients and several control rod withdrawal transients were analyzed with good results. Sensitivity studies indicated that the time-step size can affect transient results significantly.

18J. Reactor Materials

515,471
DE84014680/GAR PC **A02**/MF **A01**
Argonne National Lab., IL.
Comparison of L04, L05, and L07: Three Irradiated 7-Pin Bundle TUCOP Tests.
A. E. Wright, W. R. Robinson, T. H. Bauer, A. E. Klickman, and W. J. Woods. 1984, 5p CONF-841105-3
Contract W-31-109-ENG-38
Joint meeting of the American Nuclear Society and the Atomic Industrial Forum, Washington, DC, USA, 11 Nov 1984.
Portions are illegible in microfiche products.

Four transient-undercooling-driven overpower (TUCOP) tests on seven-pin bundles have been performed in the PFR/TREAT program. All were on full-length, bottom-plenum UK-design fuel. Three of them (tests L04, L05, and L07) tested sibling fuel elements having had the same preirradiation in PFR; one (L06) tested fresh fuel. The three tests on preirradiated fuel were designed to determine the differences in the motions of reactor-core materials that would result from the variation in power-to-flow mismatch conditions across the core of a commercial-size reactor during a hypothetical TUCOP accident. By initiating the overpower bursts at different fuel-coolant thermal-hydraulic states, the three tests yielded distinct differences in fuel and coolant response, providing a wide range of behavior useful in verifying accident models and codes. (ERA citation 10:002345)

515,472
DE84014751/GAR PC **A02**/MF **A01**
UKAEA Risley Nuclear Power Development Establishment (England).
PFR/TREAT Program: Objectives, Accomplishments, and Plans.
C. B. Cowking, H. Alter, J. Stillwell, M. H. Wood, and W. J. Woods. 1984, 3p CONF-841105-19
Contract W-31-109-ENG-38
Joint meeting of the American Nuclear Society and the Atomic Industrial Forum, Washington, DC, USA, 11 Nov 1984.

The PFR-TREAT collaborative program of transient safety testing of fast reactor fuel was established in 1979 to provide mutual advantage to USDOE and the UKAEA through irradiation of US and UK full-length fuel pins in PFR, followed by safety testing in TREAT. The tests which were planned include Transient Over-Power (TOP) and Transient Under-Cooling with Over-Power (TUCOP) tests to fuel destruction and re-distribution; the results will provide significant new information on fuel and cladding behavior in hypothetical reactor faults. The information obtained in both US and UK fuel pins is to be interpreted by both partners and published jointly when mutually agreed. Thirteen tests, on fresh and irradiated fuel, in single-pin and 7-pin test sections, were completed by the end of 1983. The test matrix, which is currently being re-evaluated, calls for additional tests to be run under the present agreement. There has been an extensive program of post irradiation examination of sibling pins in both the UK and the US to characterize the test fuel prior to destructive irradiation, including testing of irradiated cladding to determine its failure characteristics. (ERA citation 10:002350)

515,473
DE84016809/GAR PC **A02**
Oak Ridge Gaseous Diffusion Plant, TN.
Pilot Program for an Automated Data Collection System.
R. S. Burns, P. S. Johnson, and E. C. Denny. 1984, 5p K/TS-5360, CONF-8409133-1
Contract AC05-84OT21400
American Society for Engineering Management meeting, Dallas, TX, USA, 23 Sep 1984.
Paper copy only, copy does not permit microfiche production.

This report describes the pilot program of an automated data collection system and presents some of the managerial experiences during its startup. The pilot program demonstrated that improvements can be made in data collection and handling, even when a key hardware item does not meet requirements. 2 figures, 1 table. (ERA citation 10:004330)

515,474
DE84017212/GAR PC **A02**
Los Alamos National Lab., NM.
Present Status of Uranium-Plutonium Mixed Carbide Fuel Development for LMFBR.
Muneo Handa, and Yasufumi Suzuki. 1984, 13p LA-tr-84-33
Contract W-7405-ENG-36
Translated from Nippon Genshiryoku Gakkaishi; 26: No. 1, 2-7(1984).
Paper copy only, copy does not permit microfiche production.

One Oarai characteristic of a carbide fuel is that its doubling time is about 13 years which is only about half as long as that of an oxide fuel. The development of carbide fuels in the past ten years has been truly remarkable. Especially, through the new fuel development program initiated in 1974 in the United States, success has been achieved with respect to He- and Na-bond fuels in obtaining a 16 a/o burning rate without damage to cladding tubes. In 1984 at FFTF, a radiation of a fuel assembly consisting 91 fuel pins is contemplated. On the other hand, in Japan, in 1974, a Fuel Research Wing specializing in the study of carbide fuels was constructed in the Oarai Laboratory of the Atomic Energy Research Institute and in the fall of 1982, was successful in fabricating two carbide fuel pins having different chemical compositions. (ERA citation 10:004665)

515,475
DE85000193/GAR PC **A03**/MF **A01**
Westinghouse Idaho Nuclear Co., Inc., Idaho Falls.
Determination of Iodine Specific Activity in Nuclear Fuel Reprocessing Plant off-Gases.
S. J. Fernandez, G. J. McManus, and R. A. Rankin. Sep 84, 38p WINCO-1016
Contract AC07-84ID12435

This document is the final report of a method to measure the sup 127 I/ sup 129 I ratio of iodine compounds in nuclear fuel reprocessing plant off-gas streams. An integrated mass spectrometry and gas chromatography (with electron capture detection) technique was used to measure the iodine isotopic ratios. It was found during N WCF operations the sup 127 I/ sup 129 I ratio can exceed 5, meaning the impact of N WCF sup 129 I emissions may be 5 times less than presently calculated. 7 references; 14 figures, 4 tables. (ERA citation 10:001986)

515,476
DE85000864/GAR PC **A03**/MF **A01**
GA Technologies, Inc., San Diego, CA.
US/FRG Umbrella Agreement for Cooperation in GCR Development: Fuel, Fission Products, and Graphite Subprogram. Quarterly Report, January 1, 1984-March 31, 1984.
R. F. Turner. Apr 84, 26p GA-A-17574
Contract AT03-84SF11962

The exchange of fuel performance data, particularly that related to fission product transport at 1500 exp 0 to 1800 exp 0 C, has been especially active during this quarter. A strong interest in the evaluation of passively safe reactor systems in the US has caused an increase in requirements for the performance data at 1500 exp 0 to 1800 exp 0 C. The arrangements for the HFR-B1 irradiation capsule in Petten have been substantially completed by KFA. (ERA citation 10:002258)

515,477
DE85000966/GAR PC **A03**/MF **A01**
Oak Ridge National Lab., TN.

Iodine Sorption/Desorption from Low-Alloy Steel and Graphite. Draft.
R. P. Wichner, M. F. Osborne, R. A. Lorenz, and R. B. Briggs. 1980, 37p CONF-801225-5-Dr
Contract AC05-84OR21400
IAEA specialists' meeting on coolant chemistry, plateout and decontamination, Julich, F.R. Germany, 2 Dec 1980.
Portions are illegible in microfiche products.

Tests have been performed at Oak Ridge National Laboratory on the sorptive behavior of iodine on two prominent HTGR primary circuit materials - type H-451 graphite, which is the selected core graphite, and a low-alloy steel (T-22), a type which is employed in the lower temperature regions of the primary system. The main emphasis of the work is the determination of equilibrium sorptive capacities for very low iodine partial pressures. Toward this goal, the test procedures allow on-line determination of sorptive capacity down to iodine partial pressures of approx. 10 exp -11 bar in helium at a total pressure of 1 atm. The apparatus employed is of the helium flow-through type. Detectors monitor the degree of sorption on specimens and traps, which, together with the helium flowrate and source vapor pressure, yield a continuous determination of iodine mass transport. (ERA citation 10:000563)

515,478
DE85001454/GAR PC **A25**/MF **A01**
Rockwell International, Richland, WA. Rockwell Hanford Operations.
Spent Fuel Processing in Support of the New Production Reactor.
Aug 84, 581p RHO-RE-EV-47-P
Contract AC06-77RL01030
Portions are illegible in microfiche products.

As part of the New Production Reactor Program, the New Production Reactor (NPR) Project Office has initiated an Environmental Data Development Program. This program develops reactor site data for each of the three proposed reactors including: Low-Temperature Heavy Water Reactor (LTHWR); High-Temperature Gas (cooled) Reactor (HTGR); and the Special Water Reactor (SWR) at each of the proposed sites (Savannah River Plant (SRP), Hanford Site, and Idaho National Engineering Laboratory (INEL)). An important part of NPR implementation planning is each site's approach to driver fuel processing and waste management. Fuel processing, at most sites, requires extensive modifications and additions to the facilities to allow efficient processing of the uranium driver fuels and for the recovery of the enriched uranium for recycling. The information provided in this report is intended to fulfill two purposes. The main purpose is to develop a reference flowsheet, the facilities and site specific information required to support estimates of routine environmental releases, staffing and personnel exposure estimates, and representative source terms for accident scenarios. The second purpose of the report is to develop a facility baseline in enough detail to support an offsite architect-engineer's effort to develop preconceptual designs and cost estimates for facility and equipment modifications at each site. (ERA citation 10:000633)

515,479
DE85002017/GAR PC **A02**/MF **A01**
Los Alamos National Lab., NM.
Application of Wald's Sequential Probability Ratio Test to Nuclear Materials Control.
P. E. Fehlau, K. L. Coop, and J. T. Markin. 1984, 18p LA-UR-84-2782, CONF-8409170-1
Contract W-7405-ENG-36
ESARDA specialists meeting, Ispra, Italy, 10 Sep 1984.
Portions are illegible in microfiche products.

We have replaced traditional analysis methods for nuclear material control monitoring with hypothesis testing, specifically with Wald's sequential-probability-ratio test. Our evaluation of Walds'd method, applied in both vehicle and pedestrian SNM monitors, is by Monte Carlo calculation to determine the alarm probability and average monitoring times of the monitors. The vehicle monitor with Wald's test has a much shorter monitoring delay than with traditional methods, without serious compensating changes in operating characteristics. The pedestrian monitor with Wald's method also has advantages over traditional single-interval test, in that the Wald method duplicates the advantages of a moving-average technique. We verified the Monte Carlo calculations for the pedestrian monitor by means of a special program for the monitor's microprocessor controller. The observations of false-alarm probability and average monitoring time for over 500,000 tests verified the Monte Carlo results. (ERA citation 10:002016)

515,480
DE85002516/GAR PC **A03**/MF **A01**
EG and G Idaho, Inc., Idaho Falls.
ELAF Failed Fuel Plate Examination.
J. M. Beeston, L. G. Miller, K. R. Brown, and D. M. McGinty. Oct 84, 41p EGG-SE-6696
Contract AC07-76ID01570

A fuel plate examination was conducted in the hot cell and canal to determine the possible failure modes for three plates leaking fission products. The plates were irradiated in the Extended Life Aluminide Fuel (ELAF) program in support of university research reactor goals to increase the limits presently allowed. The examination indicated pitting corrosion to be the failure mode. Other failure modes such as: (a) nonbonded swelling, (b) excessive fuel swelling, and (c) overheating of the plates were not observed. (ERA citation 10:002325)

515,481
NUREG/CR-0200-REV 2/GAR PC **A99**/MF **E06**
Oak Ridge National Lab., TN.
SCALE: A Modular Code System for Performing Standardized Computer Analyses for Licensing Evaluation - Additions and Revisions.
Technical rept.,
C. V. Parks. Dec 84, 966p
Supplement to NUREG/CR-0200-REV 1.

SCALE (Standardized Computer Analyses for Licensing Evaluation), a multi-faceted computational system, has been developed to provide a standard analysis tool for use by the NRC staff and licensees in evaluation of nuclear fuel facility and package designs. Revision 3 describes recent additions and modifications made to the SCALE computational system. Combining this material with previously issued material will update the SCALE Manual to be consistent with the latest publicly released version of SCALE, called SCALE-3.

515,482
NUREG/CR-3780/GAR PC **A03**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Fuel Disruption Mechanisms Determined In-Pile in the ACRR (Annular Core Research Reactor).
Technial rept.,
S. A. Wright, and E. A. Fischer. Oct 84, 48p SAND-83-1750
Contract DE-AC04-76DP00789

This report reviews the different modes of fuel disruption as seen in experiments and then describes the mechanism responsible for the disruption. An analysis is presented that describes a set of conditions specifying the mode of fuel disruption and the heating conditions required to produce the disruption. The heating conditions are described in terms of heating rate (K/s), temperature gradient, and fuel temperature. A fuel disruption map is presented which plots heating rate as a function of fuel temperature to illustrate the different criteria for disruption. Although this approach to describing fuel disruption oversimplifies the fission gas processes modeled by SANDPIN, it does illustrate the criteria used to determine which fuel disruption mechanism is dominant and on what major fission gas parameters it depends.

515,483
NUREG/CR-3926-V1/GAR PC **A05**/MF **A01**
MAXIMA Corp., Bethesda, MD.
Strategic Analysis for Safeguards Systems: A Feasibility Study. Vol. 1. Main Report.
Technical rept. Dec 82-Sep 84,
D. A. Seaver, M. S. Cohen, W. H. Immerman, F. L. Crane, and A. J. Goldman. Dec 84, 80p
See also NUREG/CR-3926-V2. Prepared in cooperation with International Energy Associates Ltd., Washington, DC., and Johns Hopkins Univ., Baltimore, MD.

This study reviewed previous efforts and other game theory research in regards to Safeguard Systems and assessed the feasibility of: (1) applying strategic analysis in a regulatory framework, (2) making strategic analysis understandable by licensees, and (3) assuring that strategic analysis can effectively be enforced. This report includes a discussion of the role of strategic analysis in material control and accounting, and of the mechanisms by which the NRC could implement strategic analysis. A set of feasibility criteria are described including both technical feasibility and organizational/implementation feasibility.

515,484
NUREG/CR-3926-V2/GAR PC **A07**/MF **A01**
MAXIMA Corp., Bethesda, MD.
Strategic Analysis for Safeguards Systems: A Feasibility Study. Vol. 2. Appendix.
Technical rept. Dec 82-Sep 84,
A. J. Goldman. Dec 84, 130p
See also NUREG/CR-3926-V1. Prepared in cooperation with Johns Hopkins Univ., Baltimore, MD.

This appendix provides detailed information regarding game theory (strategic analysis) and its potential role in safeguards to supplement the main body of this report. In particular, it includes an extensive, though not comprehensive review of literature on game theory and on other topics that relate to the formulation of game-theoretic model (e.g., the payoff functions). The appendix describes the basic form and components of game theory models, and the solvability of various models. It then discusses three basic issues related to the use of strategic analysis in material accounting: (1) its understandability; (2) its viability in regulatory settings; and (3) difficulties in the use of mixed strategies. Each of the components of a game theoretic model are then discussed and related to the present context.

18K. Reactor Physics

515,485
DE85000928/GAR PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Flux Synthesis for the on-Line Surveillance of Nuclear Power Plants.
F. C. Difilippo, D. G. Cacuci, B. A. Worley, and J. M. Kallfelz. 1984, 8p CONF-840901-13
Contract AC05-84OR21400
ANS topical meeting on reactor physics and shielding, Chicago, IL, USA, 17 Sep 1984.

On-line monitoring of reactivity and power distribution in reactors requires on-line determination of flux, isotopic compositions, and reactivity changes as functions of burnup and operating conditions. Thus, the development of such a monitoring procedure depends on the availability of a calculational method that can efficiently incorporate reactor operating data and results from detailed off-line computations. This abstract briefly describes the development of a calculational method suitable for on-line reactivity and power distribution monitoring (RPDM). Underlying the development of this calculational method is the expansion of the neutron flux in a complete set of eigenfunctions corresponding to the buckling eigenvalues of a Helmholtz equation. (ERA citation 10:002290)

515,486
DE85002565/GAR PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
MCNP Code.
S. N. Cramer. 1984, 29p CONF-8410170-1
Contract AC05-84OR21400
Monte Carlo methods in nuclear reactor analysis, Ispra, Italy, 8 Oct 1984.
Portions are illegible in microfiche products.

The MCNP code is the major Monte Carlo coupled neutron-photon transport research tool at the Los Alamos National Laboratory, and it represents the most extensive Monte Carlo development program in the United States which is available in the public domain. The present code is the direct descendent of the original Monte Carlo work of Fermi, von Neumaum, and Ulam at Los Alamos in the 1940s. Development has continued uninterrupted since that time, and the current version of MCNP (or its predecessors) has always included state-of-the-art methods in the Monte Carlo simulation of radiation transport, basic cross section data, geometry capability, variance reduction, and estimation procedures. The authors of the present code have oriented its development toward general user application. The documentation, though extensive, is presented in a clear and simple manner with many examples, illustrations, and sample problems. In addition to providing the desired results, the output listings give a a wealth of detailed information (some optional) concerning each state of the calculation. The code system is continually updated to take advantage of advances in computer hardware and software, including interactive modes of operation, diagnostic

interrupts and restarts, and a variety of graphical and video aids. (ERA citation 10:002292)

515,487
DE85002646/GAR PC **A04/MF A01**
Argonne National Lab., IL.
Blackness Coefficients, Effective Diffusion Parameters, and Control Rod Worths for Thermal Reactors.
M. M. Bretscher. Sep 84, 73p ANL/RERTR/TM-5
Contract W-31-109-ENG-38
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Simple diffusion theory cannot be used to evaluate control rod worths in thermal reactors because of the strongly absorbing character of the control material. However, good results can be obtained from a diffusion calculation by representing the absorber slab by means of a suitable pair of internal boundary conditions, alpha and beta , which are ratios of neutron flux to neutron current. Methods for calculating alpha and beta in the P sub 1 , P sub 3 , and P sub 5 approximations, with and without scattering, are presented. By appropriately weighting the fine-group blackness coefficients, broad group values, < alpha > and < beta >, are obtained. The technique is applied to the calculation of control rod worths of Cd, Ag-In-Cd, and Hf control elements. Results are found to compare very favorably with detailed Monte Carlo calculations. For control elements whose geometry does not permit a thin slab treatment, other methods are needed for determining the effective diffusion parameters. One such method is briefly discussed and applied to the calculation of control rod worths in the Ford Nuclear Reactor at the University of Michigan. Calculated and measured worths are found to be in good agreement. (ERA citation 10:002310)

18M. Reactors (Non-Power)

515,488
DE85001188/GAR PC **A02/MF A01**
Department of Energy, Washington, DC. Office of Energy Research.
Statement of Dr. James S. Kane Before the Committee on Science and Technology, Energy Development and Applications Subcommittee and Energy Research and Production Subcommittee, US House of Representatives.
J. S. Kane. 25 Sep 84, 9p DOE/NBM-5001188
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It is recommended that the small research reactors with a lifetime fuel supply, and the four TRIGA reactors with FLIP type fuel, be exempted from the proposed NRC rule and that conversion of other HEU fueled reactors proceed only after existing stocks of HEU fuel elements are used, and when conversion can be done without a serious technical or economic penalty. US DOE strongly supports US initiatives to prevent nuclear weapons proliferation. However, it is seriously questioned whether broadly imposing LEU conversion on domestic university reactors (which contain only small amounts of special nuclear materials) would have any positive impact on the proliferation issue. (ERA citation 10:002324)

515,489
DE85002647/GAR PC **A03/MF A01**
Argonne National Lab., IL.
Differential Thermal Analysis Study of U sub 3 Si-Al and U sub 3 Si sub 2 -Al Reactions.
R. F. Domagala, T. C. Wiencek, J. L. Snelgrove, M. I. Homa, and R. R. Heinrich. Oct 84, 28p ANL/RERTR/TM-7
Contract W-31-109-ENG-38
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As part of the Reduced Enrichment Research and Test Reactor (RERTR) program, high density uranium compounds are being evaluated as possible replacements for the fuels currently in use. U sub 3 Si and U sub 3 Si sub 2 powders dispersed in an Al matrix and roll bonded within 6061 Al alloy clad have performed well under irradiation in the ORR. A consideration of the heats of reaction between the silicides and the Al components of a reactor fuel plate has now been addressed. By following standard quantitative differential thermal analysis (DTA) procedures, it has been demonstrated that neither silicide shows any measurable heat of reaction until the solidus temperature of 6061 (582 exp 0 C) is exceeded. On heating, the exothermic reaction is quenched by the endothermic change of state as the Al species melt. All detectable events take place in the temperature regime from approx. 580 to approx. 660 exp 0 C. The heats of reaction per gram of fuel ranged from 304 +- 18 J for samples with 32 vol. % U sub 3 Si sub 2 in the fuel zone to 486 +- 54 J for samples containing 45 vol. % U sub 3 Si in the fuel zone. 6 references, 11 figures, 7 tables. (ERA citation 10:001946)

19.
ORDNANCE

19A. Ammunition, Explosives, and Pyrotechnics

515,490
AD-A148 854/3/GAR PC **A03/MF A01**
Army Ballistic Research Lab., Aberdeen Proving Ground, MD.
Effects of Perforation L/D Ratio and Slotting on Stick Propellant Combustion.
Final technical rept. 1981-1983,
A. A. Juhasz, F. W. Robbins, R. E. Bowman, J. O. Doali, and W. P. Aungst. Oct 84, 41p BRL-TR-2602, SBI-AD-F300 518

Closed bomb combustion studies were performed on single-perforated (1P) and slotted 1P NOSOL 363 propellant samples ranging in length from 19 to 338 mm. Samples having equal webs, but differing in their perforation diameters as well as lengths were examined. Samples with larger perforation diameters (PD) (2.13) showed an increase of observed burning rate with length. For example, at 200 MPa, the burning rate of the 338 mm samples was 17 percent greater than the burning rate of the 19 mm long samples. In the case of the samples with smaller (0.940 mm) perforation diameter, however, the fastest burning rates were observed for the medium length (168 mm) rather than the longest samples. All slotted and short granular propellant samples, irrespective of perforation diameter, exhibited essentially identical burning rate characteristics. The studies indicate that, at least under closed bomb conditions, slotted 1P stick propellants burn just like granular propellants. In the case of unslotted 1P stick propellants, however, complex burning augmentation effects exist. Some of the mechanisms may involve increases in the burning rate inside the perforations due to enhanced pressure and/or erosive burning effects as well as grain splitting. Modeling propellant burning via the grain splitting and pressure build up hypotheses was partially successful in accounting for the observed effects.

515,491
AD-A148 897/2/GAR PC **A02/MF A01**
Army Ballistic Research Lab., Aberdeen Proving Ground, MD.
Application of Monte Carlo and Molecular Dynamics Methods to the Calculation of Thermodynamic Properties of Molten Salts.
Memorandum rept.,
R. D. Murphy. Oct 84, 17p BRL-MR-3395, SBI-AD-F300 523

This report summarizes the work done during the course of an ARO Summer Faculty grant at the Ballistic Research Laboratory. The technical details will be reported elsewhere. The current state of knowledge of the structural properties of hydroxylammonium nitrate (HAN) is summarized. The possibility of determining these properties by computer simulation is discussed. The features of the Monte Carlo and Molecular Dynamics approaches to computer simulation are briefly reviewed; the former method has more promise for the present problem, and its application is explored. A formula not previously found in the literature was derived for the heat capacity at constant pressure for a system at given density and temperature from a single Monte Carlo run.

515,492
AD-A148 899/8/GAR PC **A03/MF A01**
Army Ballistic Research Lab., Aberdeen Proving Ground, MD.
Hypothetical Zero Yaw Drag Trajectory of Spinning Projectiles between M = 5 and M = 10.
Final rept.,
W. F. Donovan. Nov 84, 32p BRL-MR-3404, SBI-AD-F300 525

From a review of existing techniques and extrapolation of lower velocity data, the drag characteristics of a typical spin stabilized projectile are proposed for application in the range 5<M<10.

515,493
AD-A148 978/0/GAR PC **A03/MF A01**
SRI International, Menlo Park, CA.
Environmental Fate Studies of HMX Screening Studies. Phase 1.
Final rept. May-Nov 82,
R. J. Spanggord, W. R. Mabey, T. W. Chou, D. L. Haynes, and P. L. Alfernes. Dec 82, 49p
Contract DAMD17-82-C-2100
See also Phase 2, AD-A145 122.

This report describes preliminary screening test that were performed to identify the dominant transport and transformation processes that affect the persistence of 1,3,5,7-octahydro-1,3,5,7-tetranitrotetrazocine (HMX) in the aquatic enviroment. The physical transport processes (volatilization, sediment sorption, and biosorption) were found not to be a major fate processes for HMX. A volatilization rate constant was estimated from laboratory experiments. The sorption partition coefficient K for HMX on Holston River sediment was measured at 8.7. Based on an organic carbon content of 1.3% in the sediment, a sub K value of 670 was calculated. The biosorption partition coefficient K was measured to be 63. Transformation processes that were identified to be important fate processes for HMX were photolysis and biotransformation. A first-order photolysis rate constant of 0.15/day was measured for the surface of Holston River water. The biotransformation of HMX occurs very slowly under anaerobic conditions in Holston River water but is greatly accelerated in the presence of extra organic nutrient. The aerobic biotransformation of HMX was found to occur rapidly in freshly collected HMX line wastestream water or in Holston River water with extra organic nutrients; however, the transforming organisms could not be enriched for the preliminary estimation of a biotransformation rate constant.

515,494
AD-P004 341/4/GAR PC **A02/MF A01**
Naval Weapons Center, China Lake, CA.
NATO AC/310 Activities Report on NATO STANAG 4170 and Allied Ordnance Publication 7, AOP-7 (Manual of Tests for Qualification of Explosive Materials for Military Use),
M. E. Houser, O. Dengel, R. L. Beauregard, A. Lusardi, and L. Avrami. Jun 84, 11p
This article is from 'JANNAF Propulsion Systems Hazards Subcommittee Meeting (1984) Held at Army Ballistic Research Laboratory, Aberdeen Proving Ground, Maryland on 18-20 June 1984. Volume 1,' AD-A148 865, P15-25.
Availability: Chemical Propulsion Information Agency, Johns Hopkins Road, Laurel, MD 20707 (No copies furnished by DTIC/NTIS).

The final draft of STANAG 4170 has been approved by NATO AC/310 Subgroup I (Explosives), and distributed to the participating NATO nations for ratification. The principles and methodology for the qualification of explosives, propellants, and pyrotechnics are described. The fifth draft of the AOP-7 Manual of Tests, which is the companion document to STANAG 4170, is being assembled. The principal features of assessment principles and methodologies, national qualification procedures, reference explosives, test information sheets, methods to record and issue data, and the duties of National Authorities are described in detail. (Author)

515,495
AD-P004 348/9/GAR PC **A02/MF A01**
Army Ballistic Research Lab., Aberdeen Proving Ground, MD.

Some Aspects of the Micromechanics of Hot Spot Formation in Energetic Materials,
R. B. Frey. Jun 84, 14p
This article is from 'JANNAF Propulsion Systems Hazards Subcommittee Meeting (1984) Held at Army Ballistic Research Laboratory, Aberdeen Proving Ground, Maryland on 18-20 June 1984. Volume 1,' AD-A148 865, P103-116.
Availability: Chemical Propulsion Information Agency, Johns Hopkins Road, Laurel, MD 20707 (No copies furnished by DTIC/NTIS).

We have studied the mechanics of cavity collapse in an energetic material. During cavity collapse, several mechanisms can act individually or collectively to produce high temperature hot spots. Our goal is to understand how pressurization rate, cavity size, and material parameters affect hot spot formation. For this purpose we have considered the collapse of spherical cavities using a modified form of the model of Carroll and Holt. Using this analysis, we can consider hot spots produced by plastic work, viscoplastic work, gas phase heating, or solid phase compression (which occurs as the result of high pressures produced when material collides at the center of the cavity). Under the proper conditions, each of these mechanisms may be dominant, but viscous heating is the most efficient mechanism and is dominant when the rise time of the pressure is short, viscosity is high, and/or yield stress is low. The conditions under which the other mechanisms are dominant and the dependence of hot spot temperatures on the pressurization rate, cavity size, and material properties are discussed. (Author)

515,496
DE84017002/GAR PC **A02**/MF **A01**
Lawrence Livermore National Lab., CA.
DOE Hazard Classification for Insensitive High Explosives (IHE).
R. R. McGuire, and R. P. Guarienti. Aug 84, 7p
UCRL-91420, CONF-840896-1
Contract W-7405-ENG-48
DOE hazard classification for insensitive high explosives conference, Houston, TX, USA, 28 Aug 1984.
Portions are illegible in microfiche products.

The DOE has adopted a hazard classification of IHE and IHE Subassembly based on the premise of no probability of initiation and proposed a test protocol for that classification based on an in depth understanding of the hazards involved and the response of the energetic material to relevant stimuli. This report reviews these classifications. (ERA citation 10:003229)

515,497
DE84017251/GAR PC **A02**/MF **A01**
Sandia National Labs., Albuquerque, NM.
CP DDT Detonators. II. Output Characterization.
M. L. Lieberman. 1984, 16p SAND-83-1893C, CONF-840383-6
Contract AC04-76DP00789
12. symposium on explosives and pyrotechnics, San Diego, CA, USA, 13 Mar 1984.

The combined use of a velocity interferometer system for any reflector and flash x radiography has yielded flying plate characterization of various cutback versions of a CP-loaded DDT detonator. For the conditions considered, kinetic energy of the flyer appears to vary linearly with powder column length. Loading conditions in the igniter region continue to effect output even for the full-length standard DDT detonator. Detonating conditions are indicated by an initial velocity jump and early velocity oscillations. Gurney analyses for simplified cases that are amenable to modeling have yielded velocity values that are in good agreement with the experimental value. (ERA citation 10:003227)

515,498
DE85000197/GAR PC **A02**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Asymptotic Formulas for the Motion of Shaped Charge Liners.
A. C. Robinson. Sep 84, 21p SAND-84-1712
Contract AC04-76DP00789

We use a formal expansion procedure to derive solutions to an equation of motion for shaped charge liners. This procedure reproduces results of Chou, Hirsch and Ciccarelli for small angle deflection while providing additional useful formulas and insight. We obtain explicit formulas for the position and velocity of material elements of the liner as a function of time and initial Lagrangian position of the element. The initial curvature of the liner is not assumed to be infinitesimal. However, it is shown that the explicit curvature of the liner does not enter into the formulas so that previously obtained results may also be applied to the finite curvature case. The analysis also shows how a Lagrangian spatial variable, which need not be arclength, enters into the formulas. The formulas are convenient for applications in analytical shaped charge codes. (ERA citation 10:001135)

515,499
DE85001039/GAR PC **A02**/MF **A01**
Lawrence Livermore National Lab., CA.
Detonation E.O.S. Patterns for Several Explosives.
L. Green, E. L. Lee, A. C. Mitchell, F. Ree, and R. Tipton. 13 Jul 83, 6p UCRL-89006, CONF-830763-17
Contract W-7405-ENG-48
AIRAPT international high pressure conference, Albany, NY, USA, 25 Jul 1983.

The available overdriven shockwave data for a number of explosives have been analyzed and compared. The data follow neither a constant gamma pattern nor the JWL EOS that fits expansion data to high accuracy. Modifications of the JWL function are proposed to correct for discrepancies and also to allow for the appropriate volume dependence of the Grueneisen constant indicated by previous and more recent work. The deviations from the JWL form of the equation of state appear directly above the CJ point for 9404 and PETN while Pentolite and TNT agree with this form over a portion of the Hugoniot. The comparisons with other experiments and a theoretical EOS indicate nonequilibrium behavior. (ERA citation 10:003228)

515,500
N85-13072/2/GAR PC **A03**/MF **A01**
Foersvarets Forskningsanstalt, Stockholm (Sweden).
Official Journey to USA, November 1983. Symposium on the Compatibility of Explosives; Mound Laboratory; Naval Surface Weapons Center.
A. Alm. Aug 84, 45p FOA-C-20548-D1
In Swedish; English Summary. Proc. Of Joint Symp. On Compatibility and Processing of Plastics/Mater. With Explosives, Propellants, Pyrotech. And Ingredients, Lake Ozark, Mo., 31 Oct.-2 Nov. 1983; Sponsored by American Defense Preparedness Association.

The compatability of explosives with other materials, the stability of explosives, chemical and physical analyses of explosives process technology and environmental and safety aspects are discussed.

515,501
PAT-APPL-6-666 785/GAR PC **A02**/MF **A01**
Department of the Air Force, Washington, DC.
Variable Density Frangible Projectile.
Patent Application,
J. A. Snide. Filed 31 Oct 84, 8p AD-D011 443/9
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A frangible projectile comprising a plurality of interfitting, filled polymeric portions is provided with controlled properties. The filler, amount of filler and the polymeric material may be the same or different for the various portions and sections of the projectile, thus permitting selective control of mechanical, physical and thermal properties, and weight balance of the projectile. It is contemplated that the projectile of the present invention will be most useful for weapons in the 20-40 mm range, although larger and smaller projectiles may also be fabricated according to the invention.

515,502
PB85-141596/GAR PC **E04**/MF **E04**
Institut Franco-Allemand de Recherches, Saint-Louis (France).
Étude, par la Methode de Coin, de la Composition B2141 (SNPE): Correlation entre l'Amorcabilite et la Formulation d'un Explosif a Liant Plastique (Wedge-Technique Investigation of Composite Explosive B2141 (SNPE). Correlation between Ignitability and Formation of an Explosive with Plastic Bond),
H. Moulard. 12 Mar 84, 37p ISL-RT-501/84
Text in French, summaries in German and French. Sponsored by Centre de Documentation de l'Armement, Paris (France). Direction des Recherches, Etudes et Techniques.

The explosive B2141 (88% hexogen, 12% inert bond PBHT) is investigated with the wedge method (Wedge test). Depth and reignition delay as well as the shock polars of this explosive could be determined. The results obtained provide new findings about the role played by granulometry in the shock - detonation transition.

515,503
PB85-143758/GAR PC **E03**/MF **E01**
Swiss Federal Dept. of Defence, Bern.
Optimization of Boattails for Small Arms Bullets,
B. Kneubuehl. 1983, 23p
Presented at the International Symposium on Small Arms Held at Quantico, Virginia, 1983.

The greatest improvement comes from the nose cone shape. The nose cone shape is therefore of primary design importance. Nevertheless the optimization of the boattail results in measurable advantages at the same round costs. It is therefore useful also to take its design into considerations.

19C. Combat Vehicles

515,504
AD-A149 070/5/GAR PC **A02**/MF **A01**
Army Research Inst. for the Behavioral and Social Sciences, Alexandria, VA.
Fire Support Team Vehicle (FIST-V) System: An Analysis of Human Factors, Training, Safety and Related Considerations.
Research rept.,
G. M. Gividen, and J. M. Levine. Dec 84, 18p Rept no. ARI-RN-84-141

A human factors, training and safety evaluation of the FIST-V was conducted at Fort Sill, OK, Sep - Dec 1982 in conjunction with the FIST-V OT II. This report of this evaluation identified problems in the area of man-machine interface, safety and training that significantly detract from the combat effectiveness of the FIST-V. It is concluded that constraints imposed by the requirement to use the current TOW/M113APC vehicle as the basic vehicle preclude the correction of many of those problems. However, the report points out other deficiencies that are not difficult to correct or improve. (Author)

19D. Explosions, Ballistics, and Armor

515,505
AD-A148 870/9/GAR PC **A03**/MF **A01**
Naval Surface Weapons Center, Silver Spring, MD.
Guidelines for Predicting the Effects of Underwater Explosions on Swimbladder Fish.
Final rept.,
D. J. O'Keeffe. 29 Mar 84, 42p Rept no. NSWC/TR-82-326

This report is a guide for predicting the effects of underwater explosions on swimbladder fish. Computer calculations have been made covering a wide range of fish sizes, explosive charge weights, and depths of burst. Contour plots of kill probability are presented along with equations depicting maximum range in terms of charge weight. A criterion is established which should aid in minimizing fish-kill, and an upper limit is set on the lateral extent of kill for a given charge weight.

515,506
AD-A148 896/4/GAR PC **A03**/MF **A01**
Army Ballistic Research Lab., Aberdeen Proving Ground, MD.
Acceleration Measurements in High G Environments.
Final technical rept.,
J. O. Pilcher. Nov 84, 26p BRL-TR-2610, SBI-AD-F300 520
Presented at the American Control Conference, Jun 82, Alexandria, VA.

This report discusses the difficulties encountered in acceleration measurements performed on gun and projectile systems and the techniques used to circum-

vent these difficulties. Particular points of discussion are the use of mechanical, digital, and electronic filtering techniques and their limitations.

515,507

AD-A149 022/6/GAR PC **A05/MF A01**
S and D Dynamics, Inc., Huntington, NY.
Projectile Motion in a Flexible Gun Tube.
Final rept. 15 Nov 82-15 Mar 84,
M. T. Soifer, and R. S. Becker. Oct 84, 85p ARO-19688.2-EG, BRL-CR-536, SBI-AD-F300 524
Contract DAAG29-83-C-0004

A general, six degree-of-freedom model of a projectile of finite geometry and inertia traveling in a flexible, rifled or smoothbore gun tube has been developed. The model accommodates projectile spin, mass eccentricity, projectile/bore interfacial friction, elastic/plastic deformation of the projectile rotating band, and balloting--including bourrelet impact and rebound with the bore. The model is unrestricted regarding gun tube motion, and provides the ability to assess the mutual effects of projectile/gun-tube interaction when solved simultaneously with the equations of a compatible gun dynamics simulation, such as DYNACODE-G. The basic formulation has been compared with other projectile in-bore motion formulations and descriptions appearing in recent literature, and is considered to be the most general developed to date. In addition, the model has been correlated with experimental in-bore radar doppler data obtained from firings of a specially designed 37mm weapon, and has demonstrated excellent theoretical/experimental agreement.

515,508

AD-P004 347/1/GAR PC **A02/MF A01**
Hercules, Inc., Magna, UT. Bacchus Works.
Summary of the Mechanism of Delayed Detonation,
A. G. Butcher, K. P. McCarty, R. L. Keefe, and E. J. Bloomer. Jun 84, 21p
This article is from 'JANNAF Propulsion Systems Hazards Subcommittee Meeting (1984) Held at Army Ballistic Research Laboratory, Aberdeen Proving Ground, Maryland on 18-20 June 1984. Volume 1,' AD-A148 865, P81-101.
Availability: Chemical Propulsion Information Agency, Johns Hopkins Road, Laurel, MD 20707 (No copies furnished by DTIC/NTIS).

For the past several years extensive studies have been conducted into the aspects of certain observed types of delayed detonation phenomena. These studies have been directed primarily to events preceding detonation as opposed to events after shock formation has occurred. The types of detonation transition which have been investigated are deflagration to detonation transition, DDT, and impact initiated delayed detonation, XDT. Most of the work has been published under the individual topics of XDT and DDT. This paper presents a summary of the work on both subjects in an effort to show similarities in the basic behavior of delayed detonation. It references experimental results from XDT and DDT and ties these results together with respect ot the basic mechanisms leading to transition. Published work from several laboratories are referenced to broaden the data base of condition under which delayed detonation can occur. (Author)

515,509

DE85000300/GAR PC **A02/MF A01**
Los Alamos National Lab., NM.
Piezoelectric Stress Transducer Used for Measurements of Explosions in Hard Rock.
L. Junde, and L. Xueliang. 1984, 8p LA-tr-84-50
Contract W-7405-ENG-36
Translated from Chengdu baozha yu chong ji; 3: 73-76(1983).
Portions are illegible in microfiche products.

The piezoelectric transducer uses two crystal plates which have the good features of high stiffness, high water tightness and simple manufacturing technique, etc., for assembling the structure and the riveting technique. Examples of part of the test results are given in the paper. (ERA citation 10:003225)

515,510

PB85-144525/GAR PC **E04/MF E04**
Societe Nationale des Poudres et Explosifs, Vert-le-Petit (France). Centre de Recherches du Bouchet.
Plaques Polyurethannes pour Blindages Transparents (Polyurethane Plates for Transparent Blinding),
J. Pattein. 18 Jun 84, 34p
Text in French. Sponsored by Centre de Documentation de l'Armement, Paris (France). Direction des Recherches, Etudes et Techniques.

This study makes it possible to confirm the superiority in ballistic performance of massive transparent polyurethanes from SNPE as compared with polycarbonate. Optimization of the formulations on the criterion of ballistic evaluations at room temperature has made it possible to keep the PU 3125, the best performing formulation against the perforating 7.62 projectile. In addition, it was demonstrated that the glass-polyurethane blindings achieved exhibited improvements compared to the glass-polycarbonate blindings, as far as optic quality, surface properties (abrasion, scratches) and crazing resistance are concerned.

19F. Guns

515,511

AD-A148 901/2/GAR PC **A02/MF A01**
Army Armament Research and Development Center, Dover, NJ. Large Caliber Weapon Systems Lab.
Evaluation of Titanium Diboride Gun Tube Coatings.
Final technical rept.,
A. J. Bracuti, and L. A. Bottei. Nov 84, 14p ARLCD-TR-84020, SBI-AD-E401 262

Samples of AISI 4140 and AISI 4130 steel were coated with the intermetallic compound titanium diboride (TiB2) by means of a relatively low temperature electrodeposition process which does not harm the steel substrate. The erosion resistance of these samples was evaluated at various pressure levels in the U.S. Army Armament Munitions and Chemical Command vented closed bomb test fixture using laboratory prepared M30 propelling charges. The coasted samples apparently eroded faster than steel. The effects of the TiB2-steel interface dominated the data to such an extent that no legitimate comparison between steel and TiB2 could be made.

20. PHYSICS

20A. Acoustics

515,512

AD-A148 871/7/GAR PC **A03/MF A01**
Naval Underwater Systems Center, New London, CT. New London Lab.
Development of a Prototype Wavevector-Frequency Spectral Analysis System.
Technical document,
W. A. Strawderman. 12 Dec 84, 35p Rept no. NUSC-TD-7295
Presented at the Meeting of the Acoustical Society of America (108th), Minneapolis, MN, 8-12 Oct 84.

This document consists of the text and slides of an invited paper presented at the 108th Meeting of the Acoustical Society of America, held in Minneapolis, Minnesota, from 8 to 12 October 1984. The following abstract was published in the program for the 108th Meeting (J. Acoust. Soc. Am., Supplement 1, Vol. 76, Fall 1984). By the mid-1970's, the use of wavevector-frequency spectral analysis as a diagnostic tool for structural-acoustics had been theoretically and experimentally demonstrated. In anticipation of a continuing need for this diagnostic capability, we decided to develop a wavevector-frequency spectral analysis system suitable for general application in spatially planar fields. This paper outlines the development of that prototype system, from theory to hardware. Emphasis is focused on the practical aspects of the development and the consequence of design decisions. Data from a simple, but practical, application of the system are presented and discussed.

515,513

AD-A148 921/0/GAR PC **A02/MF A01**
National Bureau of Standards, Washington, DC.
Acoustic Emission Transducer Calibration by Means of the Seismic Surface Pulse.
Technical rept.,
F. R. Breckenridge. Apr 82, 9p Rept no. TR-82-1
Contracts N00014-81-F-0009, N00014-82-F-0004
Pub. in Jnl. of the Acoustic Emission, v1 n2 p87-94 Apr 82.

No abstract available.

515,514

AD-A148 979/8/GAR PC **A02/MF A01**
Georgetown Univ., Washington, DC. Dept. of Physics.
Linear and Nonlinear Ultrasonic Interaction on Liquid-Solid Boundaries.
Final rept. Sep 78-Sep 84,
W. G. Mayer. Nov 84, 16p Rept nos. GUUS-11848-F, FTR-1
Contract N00014-78-C-0584

This final technical report lists tasks performed and titles and abstracts of all publications originating from a Contract during this reporting period. The experimental and theoretical work performed under this Contract was concerned with linear and nonlinear ultrasonic interactions on liquid-solid boundaries. The objectives of the project centered around the fact that propagation characteristics of water-borne ultrasonic signals are frequently explained and various calculations are done by applying a plane wave theory. This approach can, to a good approximation, explain some observed results of sound propagation, reflection, and transmission phenomena but fails to describe these effects whenever the sonic signal is confined to a bounded beam or when a solid reflector has a thickness which is comparable to the sonic wavelength or when the medium of propagation is nonlinear or when the reflecting solid is itself nonlinear, i.e., if its response to an impinging sonic signal depends on the beam width and frequency. The objective of the present project thus was the theoretical and experimental investigation of the propagation, reflection, and transmission of a bounded sonic beam in a nonlinear layered medium.

515,515

AD-A149 000/2/GAR PC **A02/MF A01**
Scripps Institution of Oceanography, La Jolla, CA. Marine Physical Lab.
Oceanic Reverberation Model.
Summary rept.,
W. S. Hodgkiss, Jr.. Apr 84, 15p Rept no. MPL-U-65/83
Pub. in IEEE Jnl. of Oceanic Engineering, vOE-9 n2 p63-72 Apr 84.

No abstract available.

515,516

N85-13193/6/GAR PC **A03/MF A01**
Institut Franco-Allemand de Recherches, Saint-Louis (France).
Etudes des Correlations Vitesse-Pression Acoustique Conditionnees sur le Signe et l'Amplitude de la Fluctuation de Vitesse dans UN Jet Froid (Study of the Velocity-Acoustic Pressure Correlation in a Cold Jet, Centered on the Sign and the Amplitude of the Velocity Fluctuations).
M. Schaffar, and D. Laxer. 16 Aug 83, 43p ISL-R-124/83
Text in French.

The sources of noise in cold jets were investigated using a laser velocimeter coupled with a microphone. The two dimensional exploration of the jet explains most of the noise once the correlations are integrated. Most of the noise is shear noise. The correlations are significant only for 20 and 30 deg angles. The negative part of the velocity fluctuations corresponds to most of the emitted noise.

515,517

PB85-151694 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.

Acoustical Laboratory Accreditation Program of the United States.
Final rept.,
R. J. Peppin, and D. B. Thomas. 1984, 4p
Pub. in Proceedings of Federation of Acoustical Societies of Europe, Sandefjord, Norway, August 21-24, 1984, p139-142.

Laboratory accreditation is the determination and recognition that a laboratory has the competence to carry out specific tests or calibrations. In the field of acoustical testing, the United States currently has a program to accredit laboratories. It is the National Voluntary Laboratory Accreditation Program (NVLAP) which is operated by the National Bureau of Standards. The purpose of the NVLAP is to provide a testing laboratory examination service over a broad range of product areas wherever a need is identified. The Acoustics Laboratory Accreditation Program (Acoustics LAP) of NVLAP was implemented in September, 1982, at the request of an acoustical insulation manufacturer. Laboratories can request NVLAP accreditation for one or more of 50 national and international test methods. These methods involve the measurement of the acoustical properties of materials and the sound power and sound pressure levels of products such as industrial machinery, office machines, and motor vehicles. Laboratories interested in applying for accreditation of their acoustical testing services will receive an application package which includes a list of test methods in the product area of interest, a statement of fees for participation, and a handbook which describes the technical requirements for accreditation.

20B. Crystallography

515,518
DE85000435/GAR PC **A04**/MF **A01**
Tennessee Univ., Knoxville. Nondestructive Evaluation Div.
Modeling for Ultrasonic Nondestructive Evaluation or Columnar Structures in Anisotropic Materials. Progress Report.
B. R. Dewey, B. F. Oliver, and L. Adler. 15 Dec 81, 66p DOE/ER/10585-2
Contract AS05-80ER10585
Portions are illegible in microfiche products.

The levitation zone refiner facility has been upgraded with a new crystal pulley. This produces larger crystals with better control of the crystallographic orientation. Progress also has been made toward controlled bicrystal production. Ultrasonic measurements and calculations have been performed to determine elastic constants and study velocity and alternation along principal directions in single crystal Ni; study velocity, attenuation and mode conversion along nonprincipal directions in single crystal Ni; and measure attenuation through two crystals coupled together with different orientations. Finite element development of ultrasonic wave propagation has been extended into material having cubic symmetry. Mode conversion for waves along nonprincipal directions has been demonstrated and preliminary work has been done on the two-crystal problem. Progress has advanced our understanding on techniques for ultrasonic inspection of oriented structures such as weldments and castings. (ERA citation 10:003035)

515,519
DE85000670/GAR PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Optical Second Harmonic Generation for Surface Studies.
Y. R. Shen. Aug 84, 14p LBL-18192, CONF-840821-5
Contract AC03-76SF00098
International conference on the structure of surfaces (ICSOS), Berkeley, CA, USA, 13 Aug 1984.
Portions are illegible in microfiche products.

Surface second harmonic generation (SHG), using laser pulses, is shown to be an effective tool for studying surfaces. Observations on Rh surfaces with sorbed O sub 2 , CO, and Na, and on Si during oxidation are reported. (ERA citation 10:000972)

515,520
DE85000685/GAR PC **A03**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Electron Image Simulation: A Complementary Processing Technique.
M. A. O'Keefe. Aug 84, 47p LBL-18214, CONF-8404197-1
Contract AC03-76SF00098
Pfeffercorn conference, Ocean City, MD, USA, 10 Apr 1984.
Portions are illegible in microfiche products.

At present it is difficult to use direct image processing techniques to determine the specimen structure from electron micrographs obtained under non-linear imaging conditions, and impossible when the effects of dynamical scattering are strong (as in the case of thicker specimens). However, computing techniques are available to simulate high-resolution transmission electron microscope (HRTEM) images of postulated model structures. With these techniques it is possible to confirm the validity of interpretation of recorded micrographs, to help analyze crystal defects, to characterize microscope parameters, and to determine the ranges of validity of commonly used interpretive approximations. Because processed micrographs can lead to suitable model structures and, in turn, models can indicate optimum directions for processing, the two techniques are excellent complements. Extensive references. (ERA citation 10:002981)

515,521
DE85000830/GAR PC **A03**/MF **A01**
National Bureau of Standards, Gaithersburg, MD. Center for Materials Science.
Influence of Individual Reflections on the Precision of Parameter Estimates in Least Squares Refinement.
E. Prince, and W. L. Nicholson. Aug 84, 27p PNL-SA-12490, CONF-8409165-1
Contract AC06-76RL01830
13. congress of International Union of Crystallography, Hamburg, F.R. Germany, 9 Sep 1984.
Portions are illegible in microfiche products.

A formula is derived for determining the effect of additional measurements on the precision of refined parameter estimates when a correct structure model has been established. This formula is used in an analysis of the multiple refinements based on the data from the Single Crystal Intensity Project of the International Union of Crystallography, and it is shown that the weighting scheme used in previous studies places a very heavy emphasis on a small number of weak reflections. It is also shown that, if integrated intensities or values of /F/ exp 2 are used as the observations, weak reflections have little or no influence on the refinement. An approach to the proper utilization of weak reflections is suggested, and a procedure for improving the precision of parameter estimates when experimental times limited is proposed. (ERA citation 10:002841)

515,522
DE85001085/GAR PC **A04**/MF **A01**
Wyoming Univ., Laramie.
Modelling for Ultrasonic Nondestructive Evaluation of Columnar Structures in Anisotropic Materials. Final Report.
B. R. Dewey. 1982, 61p DOE/ER/10585-T2
Contract AS05-80ER10585

Finite element modelling is feasible for anisotropic and isotropic materials. A large computer and careful attention to selection of step size are important to achieving good results. The Houbolt algorithm is recommended in most cases. Extension into three dimensions is feasible, although this was not tested here. In three-dimensional problems the size of the solutions become very much larger. Solution of the inverse problem may, indeed, be possible with the finite element method. One approach would be to have a scheme of changing depth, size, and orientation of flaw through some type of iterative process. At first, such a process would require a great amount of human intervention; then with experience the process might be incorporated in a computer program. This method may well be the basis of future, automated ultrasonic inspection systems for welds and for other fabricated parts. (ERA citation 10:003036)

515,523
N85-13175/3/GAR PC **A03**/MF **A01**
National Aeronautics and Space Administration, Huntsville, AL. George C. Marshall Space Flight Center.
Preliminary Study of Numerical Simulation of Thermosolutal Convection of Interest to Crystal Growth.
T. L. Miller. Nov 84, 33p NAS 1.60:2394, NASA-TP-2394

Calculations were performed with computer models using three types of finite difference methods of thermosolutal convection: horizontal heating of a container filled with a stably stratified solution, finger convection in a container, and finger convection in a horizontally infinite channel. The importance of including thermosolutal convection in models of crystal growth is emphasized, and the difficulties in doing so are demonstrated. It is pointed out that these difficulties, due primarily to the fine structure of the convection, may be partly overcome by the use of fine grids and implicit time stepping methods.

515,524
PB85-143246/GAR PC **E03**/MF **E03**
Bern Univ. (Switzerland). Inst. fuer Angewandte Physik.
Interfaces under Laser Irradiation,
M. F. von Allmen. 25 Oct 82, 22p

This lecture deals with structural and chemical changes in binary samples induced by short laser pulses, typically pulses in the ns regime. The reaction of a composite sample to irradiation by a short laser pulse is, conceptually and experimentally, much more complex than that of an elemental one, say, a Si wafer. Examples of composite samples are ion-implanted semiconductor crystals, or vapor-deposited films or multilayers on top of suitable substrates. Phenomena observed upon irradiation of such structures include the production of supersaturated solid solutions, the occurrence of growth instabilities, as well as the formation of metastable compounds and glassy phases. As diverse as these structures are, they may all be understood on the basis of a three-step process: (i) Heating and melting due to absorption of laser light, (ii) redistribution of the elements in the molten state, and (iii) rapid solidification of the liquid mixture. The last step clearly is the crucial one.

515,525
PB85-151629 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Atomic Structure and Optical Constants of (001) Tantalum.
Final rept.,
S. T. Ceyer, A. J. Melmed, J. J. Carroll, and W. R. Graham. 1984, 5p
Pub. in Surface Science 144, pL444-L448 1984.

Low-energy-electron diffraction evidence is presented to show that the clean (001)Ta surface is not reconstructed, that is it has the normal (1x1) symmetry, at temperatures from about 650-15 K. Optical constants, determined by ellipsometry, are given for clean (001)Ta measured in the visible spectrum. The results are put into context with previous work.

20C. Electricity and Magnetism

515,526
DE85002706/GAR PC **A02**/MF **A01**
Princeton Univ., NJ. Plasma Physics Lab.
Ohm's Law for Mean Magnetic Fields.
A. H. Boozer. Nov 84, 14p PPPL-2153
Contract AC02-76CH03073

Spatially complicated magnetic fields are frequently treated as the sum of a large, slowly varying, mean field and a small, rapidly varying, field. The primary effect of the small field is to modify the Ohm's law of the mean field. A set of plausible assumptions leads to a form of the mean field Ohm's law which is fundamentally different from the conventional alpha effect of dynamo theory. (ERA citation 10:004073)

515,527
PB85-151611 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.

Streamer Initiation in Liquid Hydrocarbons under Divergent Field Conditions.
Final rept.,
G. J. FitzPatrick, E. O. Forster, R. E. Hebner, and E. F. Kelley. Oct 84, 6p
Pub. in Proceedings of 1984 Annual Report Conference on Electrical Insulation and Dielectric Phenomena, Claymont, DE., October 21-25, 1984, p291-296.

The initiation of streamers at the surface of a needle cathode in contact with cyclohexane has been investigated using an improved optical system, allowing for high magnification of the cathode, in conjunction with a high speed framing camera. To cover a broad range of conditions the gap between the electrodes was varied from 0.2 to 0.5, 1.0 and 2.0 cm. Also, the rate of rise of the applied voltage at each gap setting ranged from 17 to 23, 29, and 35 KV/s. The streamer initiation was found to occur at a voltage which was independent of both the gap and the rate of rise of the voltage. The shape of the cathode point was found to influence the scatter of the initiation voltage particularly at the lowest applied voltages but it did not affect the average value. The significance of these observations will be discussed. The implications of these findings on the charge carrier injection process will be analyzed.

20D. Fluid Mechanics

515,528
AD-A148 971/5/GAR PC **A02**/MF **A01**
Scripps Institution of Oceanography, La Jolla, CA. Marine Physical Lab.
Richardson Number Criterion for the Nonlinear Stability of Three-Dimensional Stratified Flow,
H. D. I. Abarbanel, D. D. Holm, J. E. Marsden, and T. Ratiu. 1984, 8p Rept no. MPL-U-19/84
Contracts N00014-79-C-0472, W-7405-eng-36
Pub. in Physical Review Letters, v52 n26 p2352-2355, 25 Jun 84.

No abstract available.

515,529
AD-A149 068/9/GAR PC **A03**/MF **A01**
Wisconsin Univ.-Madison. Mathematics Research Center.
Perturbation of a Multiple Eigenvalue in the Benard Problem for Two Fluid Layers.
Technical summary rept.,
Y. Renardy, and M. Renardy. Dec 84, 39p Rept no. MRC-TSR-2775
Contract DAAG29-80-C-0041

In a recent paper, Renardy and Joseph study the Bernard problem for two layers of different fluids lying on top of each other and bounded by walls. Their study shows that, in contrast to the Benard problem for one fluid, the onset of instability can be oscillatory. The number of parameters involved in the problem is large, and there is yet no comprehensive picture of when the instability is oscillatory and when it is not. The study of limiting cases, accessible by perturbation methods, may be helpful in this respect. In this document, an analysis is given for the case when the properties of the two fluids are nearly equal and the fluids are allowed to slip at the boundaries. (Author)

515,530
N85-12864/3/GAR PC **A02**/MF **A01**
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
Local Stability Analysis for a Planar Shock Wave.
M. D. Salas. Dec 84, 14p NAS 1.60:2387, L-15768, NASA-TP-2387

A procedure to study the local stability of planar shock waves is presented. The procedure is applied to a Rankine-Hugoniot shock in a divergent/convergent nozzle, to an isentropic shock in a divergent/convergent nozzle, and to Rankine-Hugoniot shocks attached to wedges and cones. It is shown that for each case, the equation governing the shock motion is equivalent to the damped harmonic oscillator equation.

515,531
N85-12865/0/GAR PC **A04**/MF **A01**
Princeton Univ., NJ.
Study of the Structure of Turbulent Shear Flows at Supersonic Speeds and High Reynolds Number.
Final Technical Report, 1 Sep. 1981 - 31 Aug. 1984.
A. J. Smits, and S. M. Bogdonoff. Dec 84, 64p NAS 1.26:174144, NASA-CR-174144
Contract NAGW-240

A major effort to improve the accuracies of turbulence measurement techniques is described including the development and testing of constant temperature hot-wire anemometers which automatically compensate for frequency responses. Calibration and data acquisition techniques for normal and inclined wires operated in the constant temperature mode, flow geometries, and physical models to explain the observed behavior of flows are discussed, as well as cooperation with computational groups in the calculation of compression corner flows.

515,532
N85-13192/8/GAR PC **A02**/MF **A01**
Institut Franco-Allemand de Recherches, Saint-Louis (France).
Partikelmitfuehrung in Einem Kompressiblen Wirbel (Particle Entrainment in a Compressible Vortex).
W. Jaeger. 5 Oct 83, 22p ISL-CO-230/83
Text in German.

Particle entrainment in a two dimensional compressible vortex formed behind an edge in a shock wave tube was studied. The flow field was visualized by Michelson interferometry. Flow velocity was measured by laser Doppler velocimeters and doppler imaging. Experimental results are compared with numerical simulations of the flow field in a vortex. Particle motion was calculated to a first approximation using Stokes law.

515,533
N85-13194/4/GAR PC **A03**/MF **A01**
European Space Agency, Paris (France).
Model Equations Describing Unsteady Fluid Motion.
U. Nehring. May 84, 32p ESA-TT-850, DFVLR-MITT-83-17
Transl. into English of "Model-Gleichungen Zur Beschreibung Instationaerer Stroemungsvorgaenge" Dfvlr-Mitt-83-17, Goettingen, West Germany, May 1983. Report previously announced as N84-19775.

A system of nonlinear differential equations with four variables, based on a bulk viscosity concept, is presented and tested numerically. The solution by an explicit finite difference method permits the simulation of fairly general flow fields. Three dimensional flow over a backward facing step, vortex separation after a rectangular block, and the longitudinal vortex after an inclined half-plate are calculated. For step flow, qualitative agreement is obtained with experimental results on wall pressure and flow reattachment length. The physical interpretation of the equations emphasizes the effects of pressure distribution on the formation of large scale structures and on unsteady fluid motion.

515,534
N85-13195/1/GAR PC **A03**/MF **A01**
Imperial Coll. of Science and Technology, London (England).
Numerical Calculation of Steady Turbulent Flows in Adverse Pressure Gradients.
J. O. Ilegbusi. Dec 83, 28p CFD/83/9

Numerical calculations of turbulent flows in adverse streamwise pressure gradients (a boundary layer developing in a decreasingly-adverse pressure gradient; another in an increasingly-adverse one; and flow in a conical diffuser) are presented. The calculations employ a finite-domain scheme and a variant of the semi-implicit method for pressure linked equations. The effect of pressure gradient on the log-law wall-function is accounted for. An expanding-grid system is used to fit the flow configurations considered. The turbulent stresses in the transport equations are modelled using an isotropic eddy viscosity which is deduced from the specific turbulent kinetic-energy and the time-mean square of the vorticity fluctuations. The predictions compare favorably with experimental results.

515,535
N85-13196/9/GAR PC **A03**/MF **A01**
Imperial Coll. of Science and Technology, London (England).
Progress in the Development of a Two-Fluid Model of Turbulence for Near-Wall Flows, Part 1.
J. O. Ilegbusi. Apr 84, 30p CFD/84/7-PT-1
Sponsored by UK Science and Engineering Research Council.

A two-fluid turbulence model in which the fluids are defined as fast and slow and the entrainment rate is formulated to be proportional to the volume fraction of the fast fluid is described. The model constants which describe the interfluid mass transfer, friction and diffusion are optimized with reference to a boundary layer. The results based on the set of constants chosen are compared with experimental data. The results show that despite the difference in the definition of the two fluids in the experimental study and the present one, the mean velocities compare favorably.

515,536
N85-13197/7/GAR PC **A02**/MF **A01**
Imperial Coll. of Science and Technology, London (England).
Progress in the Development of a Two-Fluid Model of Turbulence for Near-Wall Flows. Part 3: Preliminary Investigation of a Stably-Stratified Boundary Layer.
J. O. Ilegbusi. Jun 84, 21p CFD/84/9-PT-3
Sponsored by UK Science and Engineering Research Council.

A compressible form of the two-fluid turbulence model is postulated. It includes buoyancy effects in the momentum equation and in the determination of the fragment size. The model is applied to a wall boundary-layer flow at low Mach number, with the difference between the stream and wall temperatures large enough for fluid properties to vary. Results show a substantial reduction in intermittency factors across the boundary layer compared with results for the case with no buoyancy. The intermittency factor and effective viscosity (and hence the turbulence level and heat flux) appear to decay with downstream distance.

515,537
N85-13198/5/GAR PC **A02**/MF **A01**
Imperial Coll. of Science and Technology, London (England).
Proposal for Wall Function for Friction and Heat Transfer in the Presence of Roughness and Mass Transfer.
J. O. Ilegbusi. Jul 84, 18p CFD/84/12
Sponsored by UK Science and Engineering Research Council.

The heat transfer characteristics of a turbulent boundary layer over a rough, porous wall through which mass is injected are predicted. A wall function that accounts for the simultaneous influences of roughness and mass transfer is proposed. Although it has no strong theoretical foundation, the proposal agrees with experiment. Cases with and without unheated lengths of plate are considered. The separate effect of roughness without mass transfer is investigated. The predictions compare well with the measurements for uniform-grain elements under fully rough conditions.

515,538
N85-13200/9/GAR PC **A03**/MF **A01**
Imperial Coll. of Science and Technology, London (England).
Laminar Jet Issuing into Stagnant Surroundings.
S. B. Jia. Mar 84, 37p PDR/CFDU-IC/15

Calculations performed with the PHOENICS code for a laminar round jet issuing into a stagnant surrounding are described. Systematic grid-dependence studies were made and grid-independent solutions were obtained. Grid-independent results agree with the exact solution. The expected similarity behavior is also predicted.

515,539
PB85-140895/GAR PC **E04**/MF **E04**
Association Aeronautique et Astronautique de France, Paris.
Calcul d'Ecoulements Internes a Grand Nombre de Reynolds par Resolution Numerique des Equations de Navier-Stokes (Computation of Internal Flows at High Reynolds Number by Numerical Solution of the Navier-Stokes Equations),
L. Cambier, B. Escande, and J. P. Veuillot. Nov 84, 36p AAAF-NT-84-01
Text in French.

This paper presents a method for computing turbulent flows at high Reynolds number based on the solution of the time-averaged Navier-Stokes equations completed by a turbulence model. The main features of the method are the implementation of a sub-domain approach and the use of a simple explicit numerical scheme associated with a zonal grid refinement technique. This technique allows to improve largely the efficiency of the method compared to the classical implementation of an explicit scheme. The numerical applications presented are relative, on the one hand, to 2-D flows in transonic channels, and, on the other hand, to the 2-D flow in a supersonic compressor cascade.

515,540
PB85-140903/GAR PC **E03/MF E03**
Association Aeronautique et Astronautique de France, Paris.
Exploitation de Calculs Tridimensionnels dans les Compresseurs Transsoniques (Development of Computations of Three Dimensional Flow through Transonic Compressors),
L. Marraffa, and A. Le Meur. Nov 84, 18p AAAF-NT-84-17
Text in French.

A program has been developed, that allows the computation of three dimensional steady transonic flow through axial rotors. It has been applied to a test case. The hypothesis of a perfect flow, without losses except those corresponding to shock waves, has been taken in this code. As for most of the three dimensional code, the computation leads to a large amount of numerical values. A particular care has been taken, to make the presentation of these results as clear as possible, to allow a quick exploration of a compressor's performance map.

515,541
PB85-145001/GAR PC **E06/MF E06**
Poitiers Univ. (France). Centre d'Etudes Aerodynamiques et Thermiques.
Etude Experimentale d'une Couche Limite Turbulente Incompressible sur une Paroi Courbe (Experimental Study of a Turbulent Incompressible Boundary Layer on a Curved Wall).
Final rept.,
P. E. Lemonnier. Jul 84, 120p
Text in French. Sponsored by Centre de Documentation de l'Armement, Paris (France). Direction des Recherches, Etudes et Techniques.

Measurements of the distribution of pressure and wall friction, the average velocity fields and its fluctuation in a previous study, though limited, had made it possible to demonstrate the considerable differences between the two boundary layers, thus confirming the importance of the study. At the same time, several errors or gaps became apparent, which had to be remedied: On the one hand, the initial conditions varied considerably for the two boundary layers investigated, on the other hand, in the case of the boundary layer on a curved wall there was a possibility of non-specified separated flow. For this study, the experimental assembly was changed by extending the test section upstream, which made it possible to obtain for the two boundary layers initial conditions which are almost identical, at least as far as the average velocities are concerned. The measurements taken are then described.

515,542
PB85-151645 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Asymptotic Density Correlations and Corrections to Scaling for Fluids with Non-Finite-Range Interactions.
Final rept.,
R. F. Kayser, and H. J. Raveche. Feb 84, 3p
Pub. in Physical Review A: General Physics 29, n2 p1013-1015 Feb 84.

The asymptotic behavior of the pair-correlation function in fluids with realistic long-range pair potentials is shown to give rise to a correction to scaling that has not been previously taken into account.

20E. Masers and Lasers

515,543
AD-A148 951/7/GAR PC **A03/MF A01**
KMS Fusion, Inc., Ann Arbor, MI.
Two-Stage Free Electron Laser Research.
Annual summary rept. 1 Oct 83-30 Sep 84,
S. B. Segall. 24 Oct 84, 30p Rept no. KMSF-U1526
Contract N00014-80-C-0614

KMS Fusion, Inc. began studying the feasibility of two-stage free electron lasers for the Office of Naval Research in June, 1980. At that time, the two-stage FEL was only a concept that had been proposed by Luis Elias. The range of parameters over which such a laser could be successfully operated, attainable power output, and constraints on laser operation were not known. The primary reason for supporting this research at that time was that it had the potential for producing short-wavelength radiation using a relatively low voltage electron beam. One advantage of a low-voltage two-stage FEL would be that shielding requirements would be greatly reduced compared with single-stage short-wavelength FEL's. If the electron energy were kept below about 10 MeV, x-rays, generated by electrons striking the beam line wall, would not excite neutron resonance in atomic nuclei. These resonances cause the emission of neutrons with subsequent induced radioactivity. Therefore, above about 10 MeV, a meter or more of concrete shielding is required for the system, whereas below 10 MeV, a few millimeters of lead would be adequate.

515,544
AD-A149 024/2/GAR PC **A03/MF A01**
Tel-Aviv Univ. (Israel). Quantum Electronics Lab.
Axial Velocity Spread Acceptance of Free Electron Lasers.
Scientific rept. 15 Jun 82-14 Jun 84,
A. Gover, and E. Jerby. 24 Jul 84, 28p QE-3/84, AFOSR-TR-84-1144

We present various criteria for the definition of axial velocity spread acceptance of free electron lasers (FEL), and provide analytical approximations, numerical calculations and design curves for this parameter in the low, high, and intermediate gain regimes. This parameter is used to calculate the energy spread acceptance, emittance acceptance and other e-beam quality parameters. A special emphasis is put on the design considerations of short wavelength (X-ray) FELs. For this reason, the parameters calculation in this work is limited to the tenuous beam regimes only, and parameters are calculated for intermediate and moderately high gain regimes, which correspond to the low quality factor of X-ray resonators in the present state of the art.

515,545
AD-A149 052/3/GAR PC **A03/MF A01**
Naval Research Lab., Washington, DC.
Free Electron Laser with a Rotating Quadrupole Wiggler.
Memorandum rept. Oct 83-Sep 84,
B. Levush, T. M. Antonsen, W. M. Manheimer, and P. Sprangle. 31 Dec 84, 38p Rept no. NRL-MR-5471

A new rotating quadrupole wiggler configuration for free-electron lasers is proposed. The stability analyses of the particles trajectories in a continuously rotating quadrupole magnetic field and self-fields of a solid beam is performed. The resulting orbit equations are solved exactly and it is shown that high-current beams can be confined. To analyze the potential of this wiggler for free electron lasers, a set of nonlinear orbit equations is derived which average over the fast time variation in both the wiggler and radiation fields. By integrating these equations, the linearized single particle gain of the free electron laser is calculated. It is shown that at comparable wiggler strengths, the rotating quadrupole wiggler and conventional wiggler give similar gains. (Author)

515,546
N85-13221/5/GAR PC **A03/MF A01**
Maryland Univ., College Park.
Investigation of RF Excited CW CO2 Waveguide Lasers.
Progress Report.
U. Hochuli. Nov 84, 26p NAS 1.26:174106, NASA-CR-174106
Contract NAG5-263

The RF excited 2 to 3W CW CO2 waveguide lasers with lifetimes of the order of 10(4) to 2.10(4) hours were produced. This was achieved with CO and N2 bearing gas mixtures and with internal as well as external discharge electrodes. It is noted that these tests were conducted with unstabilized lasers which drift around in their signatures. The average power output was reduced to about one half of the highest peak power output in the signature. One of the lasers, no. 1.1, still shows 60% of its original output power after it was cycled on and off every 10 minutes for more than 50,000 times. The starting voltage and driving point impedance of the RF excited gas discharge structure for different gas pressures and mixtures were measured. These data will serve as a basis for the matching and starting network optimization. The second laser body was frit and indium sealed. To our a vacuum leak between the bore and electrode holes was noted. The leak seems to be due to a defect or crack in the BeO body.

515,547
PB85-143238/GAR PC **E04/MF E01**
Bern Univ. (Switzerland). Inst. fuer Angewandte Physik.
Analysis of Single-Mode Evanescent-Field-Pumped Dye Amplifier,
W. Hodel, P. Anliker, and H. P. Weber. 22 Jun 83, 26p

Amplification of a light signal propagating in a single mode fiber of passive core and active cladding (dye solution) is investigated. The active cladding region is excited by the evanescent field of a pump mode. Calculations are based on exact field expressions (weakly guiding case) and rate equations for the dye under steady state conditions. Assuming the 'slow growth approximation' to be valid, two coupled nonlinear differential equations are derived for the powers in pump and signal mode, respectively. The influence of various fiber and dye parameters on the gain is studied. It is concluded that cw single pass amplification by factors of up to five seem realistically achievable.

515,548
PB85-145076/GAR PC **E04/MF E04**
Institut Franco-Allemand de Recherches, Saint-Louis (France).
Mise au Point d'un Laser HF de Faible Puissance (Perfecting a Low-Power HF Laser),
A. Sontag. 10 May 84, 30p ISL-RT-504/84
Text in French, summaries in German and French.

The development of a chemical HF laser was started at the ISL so as to have a laser in the near infrared range available. The fluorine atoms are here generated by thermal decomposition of the SF6, which is heated by an electric light arc at a pressure of about 0.6 bar. These atoms, following a rapid expansion over a classical multiple-nozzle system, are mixed with the hydrogen. A power of 20 W could be measured in the first tests for a period of several minutes.

20F. Optics

515,549
AD-A148 882/4/GAR PC **A02/MF A01**
Naval Submarine Medical Research Lab., Groton, CT.
Individual Differences in Chromatic Brightness Matching.
Interim rept.,
S. M. Luria, and D. F. Neri. 3 Oct 84, 17p Rept no. NSMRL-1031

Individual differences in brightness matches between lights of different colors were determined for color-normal observers at both photopic and mesopic light levels using the method of flicker photometry. The standard deviations of the settings made by 52 observers at photopic levels did not exceed 0.1 log unit. Variability was greatest at the extremes of the spectrum. Variability was not appreciably increased at mesopic levels.

515,550
AD-A149 078/8/GAR PC **A02/MF A01**
Spectron Development Labs., Inc., Costa Mesa, CA.
Electro-Optic Spatial Light Modulator for Thermo-Elastic Generation of Programmably Focused Ultrasound.
27 Jul 84, 4p Rept no. SDL-84-2361-01
Contract N00014-84-C-0058

The objective of the program is to produce a device which is capable of converting light energy into ultra-

sound energy and, by suitable coupling to a solid or liquid target, produce a focusing of the sound within the target.

515,551
PAT-APPL-6-867 194/GAR PC **A02**/MF **A01**
Department of the Air Force, Washington, DC.
Diffraction Diffusion Screen with Holographically-Suppressed Zero-Order Beam.
Patent Application,
M. J. Chern. Filed 1 Nov 84, 14p AD-D011 445/4
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A diffusing screen (50, 50 ft, 50 in, 102) of a transmission hologram (54, 80, 94, 112) located adjacent to a diffraction optics directional diffusing screen (52, 86, 92, 114) suppresses zero-order light from the diffusing screen thereby providing a device having the advantages of a directional diffusing screen but which does not have the disadvantages associated with zero-order light.

515,552
PB85-144699/GAR PC **E04**/MF **E04**
Laboratoires de Marcoussis - Centre de Recherches (France).
Coupleur Semi Passif Integre pour Reseau a Fibres Optiques (Integrated Semi-Passive Coupler for Optical Fiber System),
D. P. Dumas, L. Jeunhomme, and D. Haux. Aug 84, 73p
Text in French. Sponsored by Centre de Documentation de l'Armement, Paris (France). Direction des Recherches, Etudes et Techniques.

This study has made it possible for our laboratory to become well acquainted with the technology of ion exchanges in glass. Its objective was to arrive at a special device, whose implementation led to a further study of the interface problems of the guides with the other classical components of an optic fiber connection (sources, detectors, fibers) rather than the so-called propagation phenomena in these guides. The results obtained go beyond the framework of implementation of a semi-passive coupler and should allow an investigation of other necessary components for optical connections (dividers, concentrators, multipliers, demultipliers). However, it is necessary to improve the performances of the guides with two actions: A glass study well adapted to ion exchanges and with low intrinsic attentuation, Mastering the aluminum deposit operations (or other materials), and photolithoillustration to obtain very efficient and well-defined diffusion screens.

20G. Particle Accelerators

515,553
DE85001710/GAR PC **A02**/MF **A01**
Sandia National Labs., Albuquerque, NM.
High Power Pulsed Accelerators with Potential Industrial Applications.
M. T. Buttram, and K. R. Prestwich. 1984, 17p
SAND-84-1478C, CONF-841117-7
Contract AC04-76DP00789
Conference on the application of accelerators in research and industry, Denton, TX, USA, 12 Nov 1984.
Portions are illegible in microfiche products.

Radiation processing sources fall into two categories, electron beams and nuclear decay products (gamma rays). Applications requiring high average power (> 100 kW), high dose rate, or limited deposition depth are performed with electrons. Typically, the electron sources that are used for radiation processing are either dc accelerators or linacs with peak powers in the 50 to 200 kW regime. Recent advances have made the development of pulsed electron sources in this parameter range attractive as well. Pulsed sources operate with space charge limited cold cathode emission on the microsecond or submicrosecond time scale. As a result, the dose rates are much higher than currently available. This paper will describe a design for a 10 MV, 100 kW or greater accelerator for large area electron beam irradiation or for bremsstrahlung conversion. The design is based on pulse transformers to generate megavolt, microsecond pulses, saturable magnetic core switching to compress to shorter pulse lengths, pulse-forming line adder techniques to transform to 10 MV, and a magnetically insulated cold cathode diode for electron beam formation. The status of these various technologies is reviewed. (ERA citation 10:002026)

515,554
DE85002498/GAR PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Status Report on the ORNL (Oak Ridge National Laboratory) 25 URC Accelerator.
N. F. Ziegler, E. G. Richardson, J. E. Mann, R. C. Juras, and C. M. Jones. Oct 84, 7p CONF-8410172-2
Contract AC05-84OR21400
Symposium of northeastern accelerator personnel, Stony Brook, NY, USA, 15 Oct 1984.

The Oak Ridge tandem accelerator operated quite successfully during the past year. An oxygen beam was accelerated through the machine with a terminal potential of 22.5 MV and scheduled experiments were run at voltages up to 20.3 MV. The replacement of about 75% of the accelerator tubes was completed in October 1983, and is probably the major contributor to higher voltage operation. From January to October 1984, the accelerator operated for 3172 hours with beam while maintenance has consumed 1120 hours. Maintenance time includes two scheduled periods for a total of 448 hours. (ERA citation 10:003136)

515,555
DE85002551/GAR PC **A05**/MF **A01**
Sandia National Labs., Livermore, CA.
STAR: Sandia Technology Applications Ring Conceptual Design Report.
K. W. Battieson. Oct 84, 78p SAND-84-8012
Contracts AC03-76SF00098, AC04-76DR00789
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Sandia National Laboratories, jointly with Lawrence Berkeley Laboratory, has designed an electron synchrotron vacuum ultraviolet (vuv) light source, STAR, the Sandia Technology Applications Ring. STAR is a small technology-oriented light source in contrast to existing synchrotron light sources which have been research oriented and have consequently emphasized extending the state-of-the-art in machine parameters. The design of a technology-oriented source invariably involves trade-offs in major design parameters such as intensity, spectral range, pulse length, size, and cost. For a machine such as STAR, the size and cost are reduced to the point that an individual corporation or consortium can have its own facility and hence can tailor operational characteristics (such as access, scheduling, beam parameters, and user friendliness) to its specific needs. The design philosophy of STAR is to incorporate many features developed and proven at other vuv rings. The major technical difference between STAR and other synchrotron light sources is that STAR is designed for a beam current substantially lower than the difficult-to-achieve one ampere design level of other rings. This permits the use of lower cost, low energy injection of electrons into the ring. In addition, particular attention has been paid to vacuum and diagnostic considerations. The approach of using proven technology coupled with an engineering emphasis to address known critical areas is expected to permit rapid commissioning of a ring that would also serve as a prototype for other dedicated technology rings. (ERA citation 10:003117)

515,556
DE85002587/GAR PC **A02**/MF **A01**
Stanford Linear Accelerator Center, CA.
Single-Cavity SLED Device.
B. A. Lippmann. Sep 84, 4p SLAC/AP-33
Contract AC03-76SF00515
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The conventional SLED device used at SLAC requires two cavities. However, the same effect can be obtained with a single cavity; the theory and operation of the device is the same, only the hardware is changed. The single-cavity device is described here. (ERA citation 10:003118)

515,557
DE85002610/GAR PC **A13**/MF **A01**
Brookhaven National Lab., Upton, NY.
RHIC And Quark Matter: Proposal for a Relativistic Heavy Ion Collider at Brookhaven National Laboratory.
Aug 84, 277p BNL-51801
Contract AC02-76CH00016
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This document describes the Brookhaven National Laboratory Proposal for the construction of a Relativistic Heavy Ion Collider (RHIC). The construction of this facility represents the natural continuation of the laboratory's role as a center for nuclear and high-energy physics research and extends and uses the existing AGS, Tandem Van de Graaff and CBA facilities at BNL in a very cost effective manner. The Administration and Congress have approved a project which will provide a link between the Tandem Van de Graaf and the AGS. Completion of this project in 1986 will provide fixed target capabilities at the AGS for heavy ions of about 14 GeV/amu with masses up to approx. 30 (sulfur). The addition of an AGS booster would extend the mass range to the heaviest ions (A approx. 200, e.g., gold); its construction could start in 1986 and be completed in three years. These two new AGS experimental facilities can be combined with the proposed Relativistic Heavy Ion Collider to extend the energy range to 100 x 100 GeV/amu for the heaviest ions. BNL proposes to start construction of RHIC in FY 86 with completion in FY 90 at a total cost of 134 M$. (ERA citation 10:003133)

515,558
DE85002628/GAR PC **A02**/MF **A01**
Stanford Linear Accelerator Center, CA.
Notes on the RF System for the SLC Positron Source.
H. Hoag. 17 Oct 84, 6p SLAC-CN-282
Contract AC03-76SF00515
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The proposed arrangement of accelerator structures, waveguide feeds and klystrons is shown. A 50 MW klystron at 20-3C will provide power for the high-field capture section immediately following the target. About 1 meter downstream of this section there will be a standard girder of four 3.05-meter SLAC constant gradient accelerator sections. These will be powered by a klystron at station 20-3D. Current thinking is that this will also be a 50 MW tube, but 35 MW might well be sufficient. Both stations will be SLEDded. The length of the rectangular waveguide feed to the capture section will be approximately 132 ft, and the attenuation will be about 0.97 db. The corresponding numbers for the feed to the standard girder are 153 ft and 1.07 db. In CN-268 dated 6/22/84: Positron Source: First 50 Nanoseconds, K. Moffeit shows that good positron acceptance requires very high accelerating fields (on the order of 70 MV/m) in the first meter following the target. Various ways of approaching this gradient in a 1-meter section have been examined. (ERA citation 10:003119)

515,559
DE85002721/GAR PC **A02**/MF **A01**
Stanford Linear Accelerator Center, CA.
Proposal for Hollow Cathode Electron Gun for Electron Cooling.
F. Krienen, and W. B. Herrmannsfeldt. Sep 84, 4p
SLAC-PUB-3445, CONF-8409171-1
Contract AC03-76SF00515
Workshop on electron cooling, Karlsruhe, F.R. Germany, 22 Sep 1984.
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If we consider a magnetic shunt, an iron plate with a hole in it, sandwiched between two solenoids which are polarized in opposite direction, the resulting magnetic field would be shaped. If we put a voltage between the magnetic shunt and two conducting plates perpendicular to the z-axis in a symmetric fashion, we would obtain the same shape of the electric field, because both E and B may be derived as gradient of a potential. We propose to explore this simple physical system, in which E and B are everywhere parallel, to obtain low temperature, magnetically confined electron beams. (ERA citation 10:003152)

515,560
DE85002763/GAR PC **A03**/MF **A01**
California Inst. of Tech., Pasadena.

Ion Beam Mixing: Basic Experiments.
B. M. Paine, and R. S. Averback. Oct 84, 33p CONF-840760-15
Contract W-31-109-ENG-38
Ion beam modification of materials conference, Ithaca, NY, USA, 16 Jul 1984.
Portions are illegible in microfiche products.

We review basic experiments in ion beam mixing of simple layered solid systems. Most have employed ions with mass from 20 to 136 amu and energies between 50 and 600 keV, while sample configurations fall into two categories: approx. 10 A marker layers of impurity atoms buried in otherwise homogeneous media, and bilayers of two materials of several hundred A each. We tabulate the quantitive results of all such measurements reported to date for marker systems, and the low temperature (in the temperature independent regime, or < 300 degrees K) results for bilayers. We also compare the collected results with quantitative calculations of collisional mixing and qualitative pictures of relaxation and thermal diffusion mixing from molecular dynamics simulations and chemical rate theory. (ERA citation 10:003123)

515,561
DE85003040/GAR PC **A03**
Argonne National Lab., IL.
3D Field Calculation of the GEM Prototype Magnet and Comparison with Measurements.
R. J. Lari. 28 Oct 83, 31p CONF-8310336-1
Contract W-31-109-ENG-38
Mag-U-Comp conference, Milwaukee, WI, USA, 26 Oct 1983.
Paper copy only, copy does not permit microfiche production.

The proposed 4 GeV Electron Microtron (GEM) is designed to fill the existing buildings left vacant by the demise of the Zero Gradient Synchrotron (ZGS) accelerator. One of the six large dipole magnets is shown as well as the first 10 electron orbits. A 3-orbit prototype magnet has been built. The stepped edge of the magnet is to keep the beam exiting perpendicular to the pole. The end guards that wrap around the main coils are joined together by the 3 shield plates. The auxiliary coils are needed to keep the end guards and shield plates from saturating. A 0.3 cm Purcell filter air gap exists between the pole and the yoke. Can anyone question this being a truly three-dimensional magnetostatic problem. The computer program TOSCA, developed at the Rutherford Appleton Laboratory by the Computing Applications Group, was used to calculate this magnet and the results have been compared with measurements. (ERA citation 10:005131)

20H. Particle Physics

515,562
DE85000676/GAR PC **A04/MF A01**
Sandia National Labs., Albuquerque, NM.
WESF sup 137 Cs gamma Ray Sources.
B. T. Kenna. Oct 84, 75p SAND-82-1492
Contract AC04-76DP00789
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The Waste Encapsulation and Storage Facility (WESF) at Hanford, Washington has been separating cesium from stored liquid defense waste since 1945. This is done to alleviate the heat generated by the decay of radioactive sup 137 Cs. The cesium is converted to CsCl, doubly encapsulated in 316L Stainless Steel, and placed in storage. Recently, the By-products Utilization Program has demonstrated the potential utility of these WESF sup 137 Cs capsules as gamma radiation sources. Registration of the WESF sup 137 Cs capsule with the NRC as a sealed gamma source would facilitate the licensing of non-DOE irradiation facilities using this source. To grant this registration, the NRC requires characteristics of the capsule. It must also be demonstrated that the capsule will maintain its integrity under both normal circumstances and specified abnormal conditions. This report provides the required information through collation of results of studies and tests done previously by other laboratories. 50 references, 5 figures, 7 tables. (ERA citation 10:000335)

515,563
DE85002334/GAR PC **A05/MF A01**
Lawrence Livermore National Lab., CA.
Nuclear Power.
Oct 84, 83p UCRL-Trans-12018
Contract W-7405-ENG-48
Translation source information not available.
Portions are illegible in microfiche products.

Information is presented concerning the contribution of military nuclear programs; new materials and compounds; understanding of matter; dynamic problems and information science; and experimental efforts. (ERA citation 10:002223)

515,564
DE85002388/GAR PC **A02/MF A01**
Los Alamos National Lab., NM.
Low-Energy Nuclear Reactions with Hydrogen Isotopes.
N. Jarmie, and R. E. Brown. 1984, 23p LA-UR-84-3349, CONF-841117-15
Contract W-7405-ENG-36
Conference on the application of accelerators in research and industry, Denton, TX, USA, 12 Nov 1984.
Portions are illegible in microfiche products.

Using the Los Alamos Low-Energy Fusion Cross-Section Facility (LEFCS), we have completed the study of the D(t, alpha)n reaction from E/sub t/ = 12.5 to 117 keV, and now have measured angular distributions of the reactions D(d,p)T and D(d, exp 3 He)n from E/sub d/ = 20 to 117 keV. The experimental equipment features a windowless cryogenic target, a precision beam-intensity calorimeter, a 10- to 120-keV accelerator producing negative tritium ins, an accurate target gas-flow and temperature system, and a tritium gas-handling system. Most of the quite anisotropic angular distributions of the D + D reactions have relative errors of about 1% and the integrated cross sections have absolut errors of about 1.5%. Astrophysical S functions extracted from the data and also from a least-squares fit of a + b cos exp 2 theta to the data show a curious behavior with energy. The cross sections, which agree with previous but less accurate data, are compared with R-Matrix calculations. We also show preliminary results for alpha-particle spectra of the T(t, alpha)nn reaction. A feature of this experiment is the flow through our windowless target of 1.5 standard liters of tritium gas per day. (ERA citation 10:004063)

515,565
PB85-139749/GAR PC **E03/MF E03**
Oxford Univ. (England). Dept. of Theoretical Physics.
Nuclear Effects in Deep Inelastic Lepton Scattering.
C. H. L. Smith. 1984, 15p REF-77/84

The author begins by briefly reviewing current understanding of deep inelastic lepton scattering on nucleons. In order to understand what happens with nuclear targets, it is important to know what distances are involved. The author therefore Fourier transforms the familiar momentum space description into coordinate space. After discussing the distances involved in the EMC effect the author turns to its origin. First the author considers the A dependence of the effect, which can be discussed in a relatively model independent way. Next the author discusses the origin of the effect for x approx = or > 0.3. Finally, the author considers the region 0.05 approx = or < x approx = or < 0.3.

515,566
PB85-139756/GAR PC **E03/MF E03**
Oxford Univ. (England). Dept. of Theoretical Physics.
Derivative Expansions of Fermion Determinants: Anomaly-Induced Vertices, Goldstone-Wilczek Currents, and Skyrme Terms,
I. J. R. Aitchison, and C. M. Fraser. 1984, 19p REF-80/84

An algebraic procedure for evaluating functional determinants in powers of derivatives of external fields is used to calculate one fermion loop contributions to low energy effective Lagrangians involving anomaly-induced vertices, Goldstone-Wilczek currents, and Skyrme terms.

515,567
PB85-139772/GAR PC **E03/MF E03**
Oxford Univ. (England). Dept. of Theoretical Physics.
Scales of Deconfinement,
M. Gross, and J. F. Wheater. Aug 84, 15p REF-70/84

The authors investigated the possibility of scales of deconfinement in SU(N) lattice gauge theories with infinitely heavy sources in different representations. They used Monte Carlo methods for N=4, factorization for N=infinity and strong coupling-mean field techniques for even N = or <16, No scales of deconfinement are found.

20I. Plasma Physics

515,568
AD-A148 904/6/GAR PC **A04/MF A01**
Naval Research Lab., Washington, DC.
Hydrodynamic Response of a Radiating Al Plasma Excited by a Proton Beam.
Memorandum rept.,
J. E. Rogerson, R. W. Clark, and J. Davis. 20 Dec 84, 55p Rept no. NRL-MR-5482

A fully self-consistent one-dimensional ion beam-slab interaction model has been developed which describes the slowing down of the beam, the hydrodynamic response and ionization dynamics of the slab, and detailed radiation emission and transport. An extensive atomic level structure with collisional radiative ionization dynamics is employed in conjunction with a hybrid radiation transport scheme which consists of a multifrequency formalism for continuum transport and a probabilistic treatment for line transport. It is found that beam deposition and slab response depend strongly on radiation transport within the slab. Temperature and density profiles and emission spectra are presented.

515,569
AD-A148 905/3/GAR PC **A02/MF A01**
Naval Research Lab., Washington, DC.
Raman Sidescattering in Laser-Produced Plasmas.
Memorandum rept.,
C. R. Menyuk, and N. M. El-Siragy. 27 Dec 84, 19p Rept no. NRL-MR-5483

The theory of the Raman sidescattering instability in an inhomogeneous plasma is revisited. The growth rate is found from the eigenvalue of a second order ordinary differential equation in the Fourier domain. Under certain, rather easily satisfied constraints, the normalized growth rate depends on a single parameter involving laser strength, gradient scale length and resonant density. Originator-supplied keywords include: Laser fusion, and Energetic electrons.

515,570
AD-A149 060/6/GAR PC **A02/MF A01**
Foreign Technology Div., Wright-Patterson AFB, OH.
Measurement of Local Heat Flux Density and Local Ion Saturation Current Density in a Plasma Jet,
X. Chen, and M. Zhou. 13 Aug 82, 10p Rept no. FTD-ID(RS)T-0058-82
Edited trans. of Lixue Yushijian (China) v3 n3 p45-47 1981, by Randy Dorsey.

No abstract available.

515,571
DE85000866/GAR PC **A02/MF A01**
Oak Ridge National Lab., TN.
Convergent Spectral Representation for Three-Dimensional Inverse MHD Equilibria.
S. P. Hirshman. Oct 84, 18p ORNL/TM-9302
Contract AC05-84OR21400

By rearranging terms in a polar representation for the cylindrical spatial coordinates (R, theta, Z), a renormalized Fourier series moment expansion is obtained that possesses superior convergence properties in mode number space. This convergent spectral representation also determines a unique poloidal angle and thus resolves the underdetermined structure of previous moment expansions. A conformal mapping technique is used to demonstrate the existence and uniqueness of the new representation. (ERA citation 10:004067)

515,572
DE85002702/GAR PC **A02/MF A01**
Princeton Univ., NJ. Plasma Physics Lab.

Collective Effects in Spin Polarized Plasmas.
B. Coppi, S. Cowley, P. Detragiache, R. Kulsrud, and F. Pegoraro. Oct 84, 24p PPPL-2147
Contract AC02-76CH03073

A fusing plasma with coherently polarized spin nuclei can be subject to instabilities due to the anisotropy of the reaction product distributions in velocity space, which is a result of their polarization. The characteristics of these instabilities depend strongly on the plasma spatial inhomogeneities and a significant rate of spin depolarization can be produced by them if adequate fluctuation amplitudes are reached. The results of the relevant analysis are, in addition, of interest for plasma heating processes with frequencies in the range of the cyclotron frequencies of the considered nuclei. (ERA citation 10:004071)

515,573

N85-13231/4/GAR PC **A03**/MF **A01**
Paris-11 Univ., Orsay (France). Lab. de Physique des Gaz et des Plasmas.
Focusing Effects of a Laser Beam in the Nonresonant Multiphoton Ionization MPI(Multiphoton Ionization) of Gases.
G. Baravian, and G. Sultan. Sep 84, 44p LP-207

A method to interpret the results of multiphoton ionization (MPI) experiments where there is no resonance and when saturation takes place is presented. A spatio-temporal intensity distribution of the laser beam in the interaction region is introduced. The calculations use Gaussian distributions but any other experimental distributions may be included. The calculation model was applied to hydrogen atoms; the MPI cross sections needed to illustrate the method were obtained using an empirical formula. The method determines the spatial distribution of the ionization rate, and the variations of this rate as a function of the peak intensity of the laser and the pulse duration. A method to determine the absolute value of the MPI cross sections in off resonance experiments with a better accuracy than the one usually obtained is outlined.

20J. Quantum Theory

515,574

N85-13232/2/GAR PC **A02**/MF **A01**
Max-Planck-Inst. fuer Quantenoptik, Garching (Germany, F.R.).
Improved Sensitivities in Laser Interferometers for the Detection of Gravitational Waves.
R. Schilling, L. Schnupp, D. H. Shoemaker, W. Winkler, and K. Maischberger. Jul 84, 13p MPQ-88
Submitted for Publication. Presented at Journees Relativistes, Aussois, France, 2-5 May 1984.

A 20 cm test Michelson interferometer was constructed inside the central vacuum tank of a 30 m apparatus, with separate suspension of the 2 near mirrors and of the simplified central block, now accommodating only the beam splitter and the Pockels cells. The resulting spectra are limited by shot noise only in a frequency range from 300 Hz to 8 kHz. This scheme was then applied to the 30 m interferometer, with 50 passes in the delay line (light path = 1.5 km). The output is still very close to shot noise in a frequency band from 1 to 8 kHz. Inside this band, the average noise in strain is 5 times 10 to the minus 19th power/sq root Hz.

515,575

PB85-139764/GAR PC **E03**/MF **E03**
Oxford Univ. (England). Dept. of Theoretical Physics.
Deconfining Transitions in 2+1 Dimensional SU(3) and SU(4) Gauge Theories,
M. Gross, and J. F. Wheater. Aug 84, 10p REF-72/84

The authors have performed Monte Carlo simulations on SU(3) and SU(4) lattice gauge theories in 2+1 dimensions at finite temperature. The systems display extremely slow relaxation to thermal equilibrium; however, very long runs seem to indicate that the deconfining transitions are not 1st order.

20K. Solid Mechanics

515,576

AD-A149 043/2/GAR PC **A02**/MF **A01**
Wisconsin Univ.-Madison. Mathematics Research Center.
Recent Developments and Open Problems in the Mathematical Theory of Viscoelasticity.
Technical summary rept.,
M. Renardy. Nov 84, 20p Rept no. MRC-TSR-2770
Contract DAAG29-80-C-0041, Grant NSF-MCS82-10950
Sponsored in part by Grant NSF-MCS82-15064.

This paper presents a nontechnical review of current research efforts in the mathematical theory of viscoelastic materials. Recent results concerning the existence, uniqueness and regularity of solutions for initial value problems as well as for steady flow problems are discussed and a number of open problems are pointed out. Originator-supplied keywords include: Viscoelastic fluids, steady flows, nonlinear evolution problems, energy estimates, development of shocks, and singular kernels.

515,577

AD-A149 071/3/GAR PC **A04**/MF **A01**
Yale Univ., New Haven, CT. Dept. of Mechanical Engineering.
Finite Element Analysis of Nonlinear Oscillations and Flutter of Shells of Revolution.
Final rept. 16 Aug 82-15 Aug 83,
A. Maewal. 6 Apr 84, 58p AFOSR-TR-84-1126
Grant AFOSR-82-0276

In chapter I, a finite element methodology is described for analysis of steady nonlinear periodic oscillations of axisymmetric shells. The technique is a combination of asymptotic analysis and the finite element method and the results that it yields include the significant effect of nonlinear interaction between the waves that travel in opposite directions along the circumference. In chapter II, an extended numerical method is described which is applicable to shells rotating at a constant speed about their geometrical axes. In the final chapter, a general solution for the problem of nonlinear flutter of axisymmetric shells is presented. The method is expected to be useful for developing a numerical scheme for analyzing this class of problems. Originator-supplied keywords include: Nonlinear flutter.

515,578

N85-13268/6/GAR PC **A03**/MF **A01**
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
Buckling Analysis for Rectangular Orthotropic Plates with Centrally Located Cutouts.
M. P. Nemeth. Dec 84, 44p NAS 1.15:86263, L-15784, NASA-TM-86263

An analysis to obtain the buckling loads of a rectangular orthotropic plate with a centrally located cutout is described. Cutout shapes can be elliptical, circular, rectangular, or square. The boundary conditions considered in the analysis are simply supported unloaded edges and either clamped or simply supported loaded edges. The plate is loaded in uniaxial compression by either uniform edge displacement or uniform edge stress. A computer program that implements this analysis is described, and the program use is demonstrated by sample problems.

515,579

N85-13279/3/GAR PC **A07**/MF **A01**
Aeronautical Research Inst. of Sweden, Stockholm.
Stress Intensity Factors for Corner Cracks at Holes Located Near an Edge.
D. Wiklander. Aug 84, 137p FFA-TN-1984-20
Contract FMV-FLYGFL-82223-80-183-21-001

The general purpose finite element code BASIS was used to calculate the variation of the mode I stress intensity factor KI along the crack front for a quarter-elliptical crack at a hole in a plate. Results of KI as function of plate thickness, distance between hole and plate edge, crack ellipticity, and crack size are given for 15 basic loading cases. Values of KI obtained differ 2% or less from the true values. A FORTRAN-module which utilizes the data base created and allows for quick interpolation between data obtained was developed.

515,580

N85-13280/1/GAR PC **A04**/MF **A01**
Centre Technique des Industries Mecaniques, Senlis (France).
Formulations et Methodes de Resolution des Problemes Classiques du Flambage Statique (Formulation and Solution Methods for Classical Problems of Static Buckling).
Final Report.
M. Dubois. Oct 83, 55p CETIM-101010
Text in French.

Fundamental equilibrum nonlinear equations are treated by classical incremental methods for the solution of nonlinear systems, including the Newton-Raphson procedures, the Riks method which assures an automatic progression along the equilibrium path, the asymptotic Koiter method, and adaptation of the Koiter method to the finite element method and linearized simplified methods. With a conservative loading the static methods are justified, and in the presence of elasüc behavior the Koiter stability theory is applicable. If the materials are not entirely elastic, the most promising method is a Rayleigh-Ritz finite element iterative method.

515,581

N85-13281/9/GAR PC **A03**/MF **A01**
Centre Technique des Industries Mecaniques, Senlis (France).
Deformations Non-Lineaires et Flambage Statique Lineaire de Structures Soumises a des Forces de Pression (Nonlinear Deformation and Static Linear Buckling of Structures under Pressure).
Final Report.
Y. Ousset. Apr 83, 33p CETIM-11-E-350
Text in French.

The Euler buckling of structures under conservative pressure loading, such as an immersed tank, is computed by a procedure in which the pressure forces, which are a nonlinear function of the displacement, are treated as a linear plus a quadratic term. The results are extended to the case of a reservoir containing an incompressible fluid with a free surface. The Ahmad superparametric thick plate element, a degenerated three dimensional element, is used with the CASTOR SD program.

515,582

PB85-145241 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Physics of Fracture.
Final rept.,
R. M. Thomson. 1983, 41p
See also PB83-234658. Sponsored by Army Research Office, Research Triangle Park, NC., Office of Naval Research, Arlington, VA., and North Atlantic Treaty Organization, Brussels (Belgium).
Pub. in Atomistics of Fracture, Calcatoggio, Corsica, France, May 22-31, 1981, NATO (North Atlantic Treaty Organization) Conference Series 6: Materials Science 5, p167-207 1983.

The title of the conference in its focus on atomistics certainly hints at the physical dimension, and it gives us our point of departure. However, before diving directly into a full-scale discussion of discrete lattices, I will first provide in the next section a very succinct background statement of the elastic description of a brittle crack. In the third section, discrete lattice theories are addressed directly, but first in one dimension for the purpose of emphasizing the kinds of phenomena for which an atomistic theory is important. This discussion points to the application of discrete lattice theories to the rates of atomic and chemical processes at the crack tip. In the fourth section we lay out the statistical mechanical framework for the thermal equilibrium of a crack and for thermally activated crack growth both for intrinsic lattices, and including interactions with external chemical environments. Then follows in section five a more detailed presentation and critique of the theoretical techniques for calculating the structure of lattices containing cracks in two and three dimensions. A short statement of the current status of the quantum theory of binding as it relates to defects will be included. Finally, in the sixth section, the question of stability of the crack in the lattice with respect to the emission of dislocations is discussed. A concluding short section summarizes the crucial points where future progress looks most promising.

20L. Solid-State Physics

515,583

AD-A148 891/5/GAR PC **A03/MF A01**
California Univ., San Diego, La Jolla. Dept. of Electrical Engineering and Computer Sciences.
Surface and Interfacial Properties of Ga(0.47)In(0.53)As Alloys.
Final rept. 1 Apr 83-30 May 84,
H. H. Wieder. 25 Oct 84, 30p
Contract N00019-83-C-0133

Semiconducting Ga0.47In0.53As layers whose lattice constants match that of semi-insulating InP are, potentially, useful for discrete and integrated circuit microwave transistors and opto-electronic sensors compatible with the low loss, low dispersion spectral window of optical fibers. Their implementation requires evaluation, modelling and interpretation of the surface and interfacial properties of this ternary semiconducting compound in terms of fundamental physical parameters. We have investigated by means of field effect-controlled galvanomagnetic measurements the properties of the dielectric-semiconductor interface of (100)-oriented n-type Ga0.47In0.53As, compared these to theoretical calculations made for its 'free' non-polar surface and to experimental measurements made by others on metal-insulator-semiconductor capacitors. Our results suggest that the equilibrium position of the surface Fermi level is not a strong function of crystallographic orientation and it is in good agreement with theoretical expectations, that the surface charge is slightly accumulated (<0.1 eV from flatband) at room temperature and the surface potential can be displaced over most of the fundamental bandgap across flatband into accumulation and that, just as for silicon, the electron mobility decreases with increasing accumulation surface charge in accordance with preliminary theoretical arguments.

515,584

AD-A148 933/5/GAR PC **A02/MF A01**
IBM Thomas J. Watson Research Center, Yorktown Heights, NY.
High Resolution Electron Energy Loss Studies of Fermi-Level States of Clean and Metallized Si(111) Surfaces.
Technical rept.,
J. E. Demuth, and B. N. J. Persson. Sep 84, 10p
Rept no. TR-25
Contract N00014-77-C-0366
Pub. in Jnl. of Vacuum Science and Technology B, v2 n3 p384-389 Jul-Sep 84.

No abstract available.

515,585

PB85-138733/GAR PC **E03/MF E03**
Science and Engineering Research Council, Chilton (England). Rutherford Appleton Lab.
Dynamical Studies Using Muons.
S. F. J. Cox. c1984, 21p RAL-84-097

The positive muon, implanted in a material, plays the role of a lightweight proton, and its behavior may be monitored in a particularly direct fashion using the technique which has become known as Muon Spin Rotation or (mu)SR. In metal lattices, muons localize at the same sites as do protons, but (mu)SR allows the diffusion of single interstitial particles to be followed. The large mass ratio proves to be a severe test of models of hydrogen behavior and an increased rate of diffusion of the lighter particle at very low temperatures may represent the onset of coherent tunnelling. In molecules, muonium is able to substitute for hydrogen and (mu)SR permits the dynamical properties of the labelled group to be monitored. In paramagnetic molecules in particular, the energy barriers to internal rotation and vibration may be deduced. A comparison of the chemical reactivity of atomic hydrogen and muonium reveals huge normal and inverse isotope effects which may be interpreted in terms of the greater tunnelling ability of the lighter isotope, or of its greater zero point motion when bound in a molecule. (Copyright (c) Science and Engineering Research Council 1984.)

515,586

PB85-151595 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Electron-Phonon Interactions and the Breakdown of the Dissipationless Quantum Hall Effect.
Final rept.,
O. Heinonen, P. L. Taylor, and S. M. Girvin. 15 Sep 84, 4p
Pub. in Physical Review B: Condensed Matter 30, n6 p3016-3019, 15 Sep 84.

The Quantum Hall Effect is manifested by plateaus in the Hall conductivity at which the current flows without loss. Recently it has been observed that as the current is increased to a critical value, corresponding to a carrier drift velocity of the order of the speed of sound, there is a dramatic onset of dissipation. The authors investigated the role in the breakdown of phonon-assisted transitions between Landau levels and calculated the steady-state power absorption. As the drift velocity of the carriers is increased there is asudden onset of dissipation, and an upper limit for the critical current is obtained.

20M. Thermodynamics

515,587

AD-A148 932/7/GAR PC **A06/MF A01**
Arizona Univ., Tucson. Engineering Experiment Station.
Internal Forced Convection to Low Prandtl Number Gas Mixtures.
Interim rept. 15 Jul 82-15 Jul 84,
M. F. Taylor, K. E. Bauer, and D. M. McEligot. 15 Jul 84, 123p Rept no. 1248-10
Contract N00014-75-C-0694

AT a Prandtl number of about 0.2, the predictions of accepted correlations for heat transfer in fully established tube flow differ by a factor more than two. Since gas turbine systems proposed for propulsion use working fluids with the Prandtl number in this range it was necessary to resolve the discrepancy. By mixing helium with xenon or hydrogen with xenon, the range 0.16 < or approx = Pr < or approx = 0.7 can be obtained. Measurements with these mixtures in a vertical tube showed that the Colburn analogy and Dittus-Boelter substantially overpredict the Nusselt number for constant property conditions; best agreement was provided by relations suggested by Petukhov and by Kays. For moderated variation of gas properties (1 < T (sub w)/T (sub b) < or approx = 2.2) the correlation for average friction factor by Taylor was verified; the exponent on the Prandtl number in his equation for heat transfer was modified to 0.65 in order to accommodate these new data.

515,588

N85-13659/6/GAR PC **A02/MF A01**
Physikalisch-Technische Bundesanstalt, Brunswick (Germany, F.R.). Abt. 1 Mechanik.
Experimentelle Zustandsgleichung fuer Bosonenga (Experimental Equations of State for Boson Gases).
J. Bortfeldt. Mar 84, 10p PTB-ME-61
Text in German.

An experimental equation of state for boson gases which satisfies microscopic theory was derived using the virial theorem. The average kinetic energy is taken from the theory of the ideal Bose-Einstein gas; the virial of the average potential energy is considered as a function of density and temperature. By solving a partial inhomogenous differential equation, an expression for the pressure, which depends on the potential energy but not on its virial, is derived. The coefficients being determined, pressure, internal energy, average kinetic and potential energy, specific isochoric heat capacity and derivable quantities are known.

515,589

PB85-151728 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Very-Low-Temperature Cooling Systems.
Final rept.,
R. Radebaugh. 1983, 79p
Pub. in Cryocoolers, Part 2: Applications, Chapter 12, p177-255 1983.

This paper is written as chapter 12 for the book Cryocoolers, by G. Walker. In this chapter the refrigeration principles and practical examples of the common techniques for reaching temperatures below 1 K are presented. The refrigeration techniques discussed are (3)He refrigerators, (3)He-(4)He dilution refrigerators, Pomeranchuk cooling, and magnetic refrigerators. Record low temperatures of 50 nK for copper nuclei, less than 50 micro K for copper electrons, and 0.21 micro K for liquid (3)He have been reached using adiabatic demagnetization of nuclear spins. Historical development, problem areas, and applications of these various cooling systems are discussed.

515,590

PB85-151736 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Fundamentals of Alternate Cooling Systems.
Final rept.,
R. Radebaugh. 1983, 47p
Pub. in Cryocoolers, Part 2: Applications, Chapter 11, p129-175 1983.

This paper is written as chapter 11 for the book Cryocoolers, by G. Walker. In this chapter the thermodynamic fundamentals applicable to any refrigeration system are discussed. Emphasis is placed on systems other than the gas-liquid systems normally used in mechanical refrigerators in hopes of stimulating new ideas in refrigeration. Because refrigeration power is proportional to the available entropy of the system, entropy comparisons are used to evaluate the potential of new systems. The systems discussed here include such things as electrons, phonons, magnetic dipoles, electric dipoles, mixtures, electrochemical cells, photons, as well as some gas-liquid-solid systems. A description of how each of these systems can be used for refrigeration, along with the useful temperature range, is presented.

20N. Wave Propagation

515,591

N85-13361/9/GAR PC **A04/MF A01**
Kansas Univ./Center for Research, Inc., Lawrence.
Scattering Models in the Microwave Regime.
Final Report.
A. K. Fung. Oct 84, 57p NAS 1.26:174001, NASA-CR-174001
Contract NAG5-268

No abstract available.

21. PROPULSION AND FUELS

21B. Combustion and Ignition

515,592

AD-A149 023/4/GAR PC **A04/MF A01**
Air Force Office of Scientific Research, Bolling AFB, DC.
AFOSR(Air Force Office of Scientific Research) Research Meeting on Diagnostics of Reacting Flow Held at New Haven, Connecticut on 21-22 March 1984.
Scientific rept. Mar 83-Feb 84,
L. H. Caveny. Feb 84, 62p Rept no. AFOSR-TR-84-1113

This document contains expanded abstracts from the 1984 meeting on the Air Force basic research program on diagnostics of reacting flow. The meeting (held at Yale University on 21-22 March 1984) presented research directed at measuring temperatures, velocities, and concentrations in high performance combustion and plasma environments.

515,593
AD-P004 346/3/GAR PC **A02/MF A01**
Sandia National Labs., Albuquerque, NM.
Thermal-Mechanical Model of Deflagration-to-Detonation in Granular Energetic Materials,
M. R. Baer, J. W. Nunziato, and R. J. Gross. Jun 84, 9p
This article is from 'JANNAF Propulsion Systems Hazards Subcommittee Meeting (1984) Held at Army Ballistic Research Laboratory, Aberdeen Proving Ground, Maryland on 18-20 June 1984. Volume 1,' AD-A148 865, P71-79.
Availability: Chemical Propulsion Information Agency, Johns Hopkins Road, Laurel, MD 20707 (No copies furnished by DTIC/NTIS).

In this work we present a multiphase, reactive flow model, based on the theory of mixtures and utilize it to describe deflagration-to-detonation transition in granular explosives and propellants. This nonequilibrium model treats each phase as fully compressible and incorporates a dynamic compaction model for the granular reactant. Formulation of the constitutive models include a pressure-dependent burn rate and experimentally-determined porous bed permeability. Numerical solutions of the one-dimensional Eulerian equations are obtained using an implicit method-of-lines solver. The model has examined two exdosives: CP and HMX. Predictions with this model agree with existing experimental observations and demostrate that a thermodynamically-consistent multiphase model can describe the flame-spread processes of convective burning and detonation.

515,594
DE84770495/GAR PC **A07/MF A01**
Karlsruhe Univ. (Germany, F.R.). Fakultaet fuer Chemieingenieurwesen.
Experimental Investigations on the Reaction Structure in Folded Pre-Mixed Flame Fronts.
Diss. (Dr.-Ing.),
E. Hoffmann-Berling. 11 Dec 82, 135p NP-4770495
In German.
U.S. Sales Only.

Subject of the experiments is the interaction of flame front expansion and flame front velocity in curved, transient and stationary, laminar flame fronts of stoichiometrical methane/air flames. For measuring the velocities, the Laser-Doppler anemometry was applied. An ionization probe with miniaturized tip proved to be very suitable for the detection of the reaction zone and for the measurement of its thickness. Systematical measurements have been carried out on a transient, folded flame front above a straight slot burner. The folding was generated by means of periodical disturbances induced by a loudspeaker screwed on the pre-mixing chamber. With increasing folding, the mean turbulent flame front velocity increases, whereas the mean laminar one decreases. In the laminar care, the flame front expansion proved to be the reason for the lower combustion velocities. For stationary, concave and convex curved flame fronts the interaction of the flame front expansion and the combustion velocity was investigated separately. Agreements and discrepancies between theory and experiments were discussed. (ERA citation 10:001069)

515,595
DE84770498/GAR PC **A07/MF A01**
Bochum Univ. (Germany, F.R.). Abt. Maschinenbau und Konstruktiven Ingenieurbau.
Noise Emission of Technical Diffusion Flames in Dependence of Mixing Parameters, Burner Dimensions and Air Preheating for Fuel Gases with Different Flame Velocities.
Diss. (Dr.-Ing.),
D. Otto. 20 Jul 82, 139p NP-4770498
In German.
U.S. Sales Only. Portions are illegible in microfiche products.

The noise emission of technical diffusion flames is composed of the flow noise of the exhaust-gas jet and of the noise by turbulent combustion. From the dimensional analysis of the parameters which characterize a burner system, an approximate solution has been derived for the representation of the noise emission. Influences of the burner dimensions and load as well as of the use of different technical fuel gases under consideration of the air preheating and the oxygen enrichment have been investigated experimentally. The combustion noise is also influenced by the instability of the combustion. Stabilizing measures reduce the noise level considerably. Several burners in a burner system can be treated as independent noise sources. Burner tests in an industrial furnace with ceramic casing and variable dimensions showed a considerable noise reduction by a lining of the furnace walls with fire proof fibrous materials. This measure resulted also in energy savings, especially during intermittent operation. (ERA citation 10:001070)

515,596
DE85001529/GAR PC **A02/MF A01**
Northwestern Univ., Evanston, IL. Dept. of Engineering Science and Applied Mathematics.
Research in Nonlinear Problems of Energy. Informal Technical Progress Report.
B. J. Matkowsky. 1984, 20p DOE/ER/04650-T1
Contract AC02-78ER04650

Research on the applications of bifurcation and stability theory was conducted, with emphasis on combustion and flame propagation, in particular the transition from laminar to turbulent flame propagation. Publications are listed and summaries of the results are presented. (ERA citation 10:002926)

515,597
DE85002710/GAR PC **A03/MF A01**
Argonne National Lab., IL.
Mixing, Chemical Reaction and Flow Field Development in Ducted Rockets.
S. P. Vanka, R. R. Craig, and F. D. Stull. Sep 84, 50p ANL-84-62
Contract W-31-109-ENG-38

Calculations have been made of the three-dimensional mixing, chemical reaction, and flow field development in a typical ducted rocket configuration. The governing partial differential equations are numerically solved by an iterative finite-difference solution procedure. The physical models include the k approx. epsilon turbulence model, one-step reaction, and mixing controlled chemical reaction rate. Radiation is neglected. The mean flow structure, fuel dispersal patterns, and temperature field are presented in detail for a base configuration with 0.058 m (2 in.) dome height, 45 exp 0 side arm inclination, and with gaseous ethylene injected from the dome plate at an eccentric location. In addition, the influences of the geometrical parameters such as dome height, inclination of the side arms, and location of the fuel injector are studied. (ERA citation 10:003077)

515,598
N85-13230/6/GAR PC **A03/MF A01**
Foersvarets Forskningsanstalt, Stockholm (Sweden).
Laser for Determining the Ignition Conditions of a Pyrotechnic Mixture.
H. Oestmark. Jun 84, 40p FOA-C-20542-D1
In Swedish; English Summary.

The characterization of an explosive, subject to thermal stimulus, by a threshold ignition energy and a threshold ignition power was studied using a CO2 laser to heat a pyrotechnic mixture of magnesium and sodium nitrate at various power levels and various pulse widths. At short pulses the sensitivity can be characterized by a threshold ignition energy density and for long pulses by a threshold ignition flux. For pulse widths between the two extremes the ignition energy density is a function of the square root of the pulse width. The experimental results are validated by theoretically solving the heat flow equation. The method allows the ignition temperature, the absorption depth, the activation energy, and the frequency factor to be calculated.

515,599
PB85-140929/GAR PC **E04/MF E04**
Norges Tekniske Hoegskole, Trondheim. Selskapet for Industriell og Teknisk Forskning.
Experimental Study of Turbulent Jet Diffusion Flames (Revised Version),
O. K. Sonju, and J. E. Hustad. 28 Jun 84, 30p
STF15-A84048, ISBN-82-595-3693-5
See also PB84-109115. Sponsored by Royal Norwegian Council for Scientific and Industrial Research, Kjeller.

Experimental studies have been made on large turbulent jet diffusion flames up to heights of 8 m and heat releases of 7.5 MW. Correlations/scaling laws have been suggested on: Flame geometry, Thermal radiation fux, and Liftoff heights.

21C. Electric Propulsion

515,600
AD-A149 074/7/GAR PC **A02/MF A01**
Carnegie-Mellon Univ., Pittsburgh, PA. Dept. of Mechanical Engineering.
Fundamental Studies on MPD(Magneto Plasma Dynamics) Thrusters.
Annual rept.,
J. L. Lawless. 1983, 20p AFOSR-TR-84-1194
Grant AFOSR-83-0033

The major goals of this work are to determine erosion rates and the limits of diffuse mode operation. Major accomplishments of the first year include: identification of a new mode of onset , identification of a nondimensional flow scaling parameter, a proposal for an improved design, and prediction of an anode thermal instability.

515,601
DE85002167/GAR PC **A05/MF A01**
Tennessee Univ., Knoxville. Transportation Center.
Electric Vehicle Demonstration Project. Final Report.
Aug 84, 94p DOE/NV/10033-1
Contract FC08-79NV10033
Portions are illegible in microfiche products.

Information is provided on electric and hybrid vehicle procurement, testing, maintenance, data collection and operational experience. Recommendations are offered to prospective electric vehicle operators. (ERA citation 10:000866)

515,602
N85-12935/1/GAR PC **A07/MF A01**
Colorado State Univ., Fort Collins. Dept. of Mechanical Engineering.
Ion Thruster Performance Model.
J. R. Brophy. Dec 84, 135p NAS 1.26:174810, NASA-CR-174810
Contract NGR-06-002-112

A model of ion thruster performance is developed for high flux density, cusped magnetic field thruster designs. This model is formulated in terms of the average energy required to produce an ion in the discharge chamber plasma and the fraction of these ions that are extracted to form the beam. The direct loss of high energy (primary) electrons from the plasma to the anode is shown to have a major effect on thruster performance. The model provides simple algebraic equations enabling one to calculate the beam ion energy cost, the average discharge chamber plasma ion energy cost, the primary electron density, the primary-to-Maxwellian electron density ratio and the Maxwellian electron temperature. Experiments indicate that the model correctly predicts the variation in plasma ion energy cost for changes in propellant gas (Ar, Kr and Xe), grid transparency to neutral atoms, beam extraction area, discharge voltage, and discharge chamber wall temperature. The model and experiments indicate that thruster performance may be described in terms of only four thruster configuration dependent parameters and two operating parameters. The model also suggests that improved performance should be exhibited by thruster designs which extract a large fraction of the ions produced in the discharge chamber, which have good primary electron and neutral atom containment and which operate at high propellant flow rates.

515,603
N85-12937/7/GAR PC **A07/MF A01**
Hughes Research Labs., Malibu, CA.
Ion Thruster System (8-cm) Cyclic Endurance Test.
Final Report, 20 Sep. 1978 - 31 Jan. 1984.
C. R. Dulgeroff, J. R. Beattie, R. L. Poeschel, and J. Hyman. Oct 84, 138p NAS 1.26:174745, NASA-CR-174745
Contract NAS3-21741

This report describes the qualification test of an Engineering-Model 5-mN-thrust 8-cm-diameter mercury ion thruster which is representative of the Ion Auxiliary Propulsion System (IAPS) thrusters. Two of these thrusters are scheduled for future flight test. The cyclic endurance test described herein was a ground-based test performed in a vacuum facility with a liquid-nitrogen-cooled cryo-surface and a frozen mercury target. The Power Electronics Unit, Beam Shield, Gimal, and Propellant Tank that were used with the thruster in the endurance test are also similar to those of the IAPS.

The IAPS thruster that will undergo the longest beam-on-time during the actual space test will be subjected to 7,055 hours of beam-on-time and 2,557 cycles during the flight test. The endurance test was successfully concluded when the mercury in the IAPS Propellant Tank was consumed. At that time, 8,471 hours of beam-on-time and 599 cycles had been accumulated. Subsequent post-test-evaluation operations were performed (without breaking vacuum) which extended the test values to 652 cycles and 9,489 hours of beam-on-time. The Power Electronic Unit (PEU) and thruster were in the same vacuum chamber throughout the test. The PEU accumulated 10,268 hr of test time with high voltage applied to the operating thruster or dummy load.

515,604
N85-13245/4/GAR PC **A04**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Evaluation of Heat Engine for Hybrid Vehicle Application.
H. W. Schneider. 31 Aug 84, 72p NAS 1.26:174163, JPL-PUB-84-14, NASA-CR-174163
Contracts NAS7-918, DE-AI01-78CS-54209

The status of ongoing heat-engine developments, including spark-ignition, compression-ignition, internal-combustion, and external-combustion engines is presented. The potential of engine concepts under consideration for hybrid vehicle use is evaluated, using self-imposed criteria for selection. The deficiencies of the engines currently being evaluated in hybrid vehicles are discussed. Focus is on recent research with two-stroke, rotary, and free-piston engines. It is concluded that these engine concepts have the most promising potential for future application in hybrid vehicles. Recommendations are made for analysis and experimentation to evaluate stop-start and transient emission behavior of recommended engine concepts.

21D. Fuels

515,605
DE84009248/GAR PC **A03**/MF **A01**
Department of Energy, Morgantown, WV. Morgantown Energy Technology Center.
In-House Coal-Fuels Combustion Technology for Use with Gas Turbines.
Jul 84, 47p DOE/METC/SP-213

This report briefly describes the Department of Energy's (DOE's) coal-fueled gas turbine program as implemented by the Department's Morgantown Energy Technology Center (METC), and presents in some detail METC in-house research and development (R and D) related to this program. Previous coal-fired gas turbines and technological barriers to their use are discussed. The incentive for the Department's coal-fueled turbines program is the development of a modular, low-cost, electric-generating capacity using domestic coal as the fuel. The program concept is an outgrowth of, and builds upon, past DOE programs in heat engines and coal preparation. Recent and anticipated advances in these technologies are being examined in an integrated systems approach to electric power generation. In-house R and D includes laboratory- and bench-scale combustion testing, systems and economic analyses, and computer modeling of the combustion and deposition processes. (ERA citation 10:001827)

515,606
DE84770500/GAR PC **A03**/MF **A01**
Bundesministerium fuer Forschung und Technologie, Bonn-Bad Godesberg (Germany, F.R.).
Joint Venezuelan-German Feasibility Study: Integrated Production and Upgrading Including Energy Supply for Orinoco Heavy Oil. Pt. A.
Nov 81, 35p NP-4770500
U.S. Sales Only.

The aim of this Study is to investigate the technical feasibility and economic profitability of an integrated unit for production and upgrading (including energy supply) of 100MBPD (100,000 barrels per day) of extra heavy crude from the Orinoco Oil Belt. The Study was jointly carried out from 1979 to 1981 by various companies involved in oil production, upgrading and energy generation. The main framework for the Study is the self-sufficient integrated concept, which is excellently suited to optimization e.g. via utilization of upgrading residues for field steam and utility generation. (ERA citation 10:000181)

515,607
DE85000025/GAR PC **A03**/MF **A01**
Purdue Univ., Lafayette, IN.
CO + H Sub 2 Reaction over Nitrogen-Modified Iron Catalysts. Quarterly Technical Progress Report, April 1, 1984-June 30, 1984.
W. N. Delgass. 1984, 40p DOE/PC/50804-7
Contract FG22-82PC50804
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The steady state Fischer-Tropsch behavior over the iron nitrides at 523 and 450 exp 0 K was compared to the kinetics over iron at similar conditions. At 523 exp 0 K, 3/1 H sub 2 /CO at atmospheric pressure, the epsilon and zeta nitrides give higher olefin to paraffin ratios and CO sub 2 activities than iron and the gamma ' nitride. At 458 exp 0 K the high olefin to paraffin yield of the higher nitrides is preserved after an induction period. Detailed Moessbauer analysis of the catalysts used at 458 exp 0 K showed < 20% incorporation of carbon and allows structural interpretation of carbon movement into, and nitrogen removal from, the nitride lattice. Quantitative analysis of the NH/sub x/D/sub 3-x/ species leaving a fresh nitride surface after a switch to D sub 2 yields NH as the average composition of the surface nitrogen-containing species. 16 references, 6 figures, 3 tables. (ERA citation 10:002048)

515,608
DE85000026/GAR PC **A06**/MF **A01**
Department of Energy, Washington, DC. Energy Information Administration.
Petroleum Supply Monthly, August 1984.
Oct 84, 106p DOE/EIA-0109(84/08)
Portions are illegible in microfiche products.

This issue features Recent Trends in Primary Petroleum Storage Capacity. This article summarizes available information on storage capacity at select points along the production and primary distribution chain. The article assesses recent changes in storage capacity and discusses some of the reasons for these changes. Also in this issue, US Crude Oil, Natural Gas, and Natural Gas Liquids Reserves presents an advance summary of information from the Energy Information Administration's US Crude Oil, Natural Gas, and Natural Gas Liquids Reserves, 1983 Annual Report, which is scheduled for release early next month. The reminder of this issue contains statistical tables on petroleum products, crude oil, fuel oil, LPG, and refinery operations. (ERA citation 10:000765)

515,609
DE85000031/GAR PC **A25**/MF **A01**
International Coal Refining Co., Allentown, PA.
General Engineering Specifications for 6000 Tpd SRC-I Demonstration Plant.
Nov 81, 581p DOE/OR/03054-T29
Contract AC05-78OR03054

This volume contains specifications for architectural features of buildings for the SRC-1 Demonstration Plant: skylights, ventilators, sealants, doors, mirrors, furring and lathing, gypsum plaster, lightweight plaster, wallboard, ceramic tile, acoustic ceiling systems, resilient flooring, carpeting, brick flooring, architectural painting, vinyl wall covering, chalkboards, tackboards, toilets, access flooring, lockers, partitions, washroom accessories, unit kitchens, dock levels, seals, shelters, custom casework, auditorium seats, drapery tacks, prefabricated buildings, stairs, elevators, shelves, etc. (ERA citation 10:000023)

515,610
DE85000032/GAR PC **A20**/MF **A01**
International Coal Refining Co., Allentown, PA.
General Engineering Specifications for 6000 Tpd SRC-I Demonstration Plant.
1981, 469p DOE/OR/03054-T28
Contract AC05-78OR03054

This volume covers building specifications for the SRC-1 demonstration plant, as follows: piles and foundations, concrete and reinforced concrete, grouting, structural steel beams, curtains, anchors, thermal insulation, etc. (ERA citation 10:000022)

515,611
DE85000033/GAR PC **A19**/MF **A01**
International Coal Refining Co., Allentown, PA.
General Engineering Specifications for 6000 Tpd SRC-I Demonstration Plant.
1982, 437p DOE/OR/03054-T30
Contract AC05-78OR03054
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This document explains the use of the General Engineering Specifications, defines terms, and describes other documents which may be used in conjunction with the General Engineering Specifications. Procedure for revision and reproduction ar also covered. General Engineering Specifications (GES) define a set of uniform, minimum, acceptable, technical requirements for equipment, services, and materials to be used in the SRC-I Demonstration Plant at Newman, Kentucky. The requirements included in the General Engineering Specifications cover design criteria, fabrication, installation, inspection, and testing. (ERA citation 10:000024)

515,612
DE85000163/GAR PC **A07**/MF **A01**
Oak Ridge National Lab., TN.
Assessment of Slurry Pump Technology for Direct Coal Liquefaction Demonstration and Pioneer Commercial Plants.
R. P. Krishnan. Oct 84, 145p ORNL/TM-9340
Contract AC05-84OR21400

This report examines the technical status of slurry pumps in coal liquefaction service. Three specific pump applications (1) coal slurry feed recirculation and pressure boosting, (2) high pressure coal slurry feedings, and (3) vacuum columns bottoms pumping are considered in this study. For each applications, pilot plant experience and specifications for demonstration and commercial plants are summarized. The uncertainties in the scale-up of these pumps to commercial sizes and the development and testing needs for eliminating these uncertainties are identified. 69 references, 7 figures, 13 tables. (ERA citation 10:000052)

515,613
DE85000176/GAR PC **A06**/MF **A01**
HRI, Inc., Miami, FL.
Heavy Oil Processing Utilizing the Dynacracking Process. Final Report.
R. Parthasarathy. 1983, 102p DOE/BC/10328-7
Contract AC19-81BC10328
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This report covers preliminary design of a heavy oil conversion unit based on HRI's Dynacracking Process. The unit is designed for operation in any of the six cases described in this report. The six cases presented demonstrate the versatility of the unit to process three different feedstocks with different product objectives and at various process conditions while keeping the reactor configuration and design fixed. The reactor incorporated in the design is identical to the one proposed for a plant to be built in Pittsburg, CA., with California Synfuels Research Corporation as the operator. An evaluative study is presented of the product qualities and possible alternatives for product utilization and upgrading. An indicative summary is made of the quality of effluents from the unit. Estimated utilities and operating requirements are presented. Overall plant material balances are included for each of the six cases. Process equipment duty specifications and offsite tankage requirements are provided and a preliminary cost estimate presented. Basic operating principles (outside the reactor) for smooth plant operation are included. Suggestions plants arrangement and layout are provided. 18 tables. (ERA citation 10:001859)

515,614
DE85000178/GAR PC **A06**/MF **A01**
North Central Forest Experiment Station, St. Paul, MN.
Economic Analysis of Three Methods to Dry Biomass Fuels.
E. Pepke. Sep 84, 122p DOE/OR/21390-T2
Contract FG05-83OR21390
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All of the systems evaluated have positive and relatively high benefit cost ratios. Although the corncob system had the highest benefit cost ratio, it is also the system with the most hypothetical assumptions. Experimentation with some of the input parameters, such as the temperature of the flue gas discussed previously, showed that the corncob dryer and combustion unit had the least stability of the four alternatives. Results of these economic analyses confirm Frea's findings on

the relative disadvantage of a rotary drum drying system compared to not predrying fuel before the boiler. Frea states that a rotary drum dryer heated by flue gas energy was not economically favorable for 50% m.c. wood chips. The pressure steam dryer would have a more positive economic picture if the low pressure steam which is generated by the system had a value to the plant. The scenario for this economic analysis report precluded valuation of the steam by-product because all systems had to be comparable; the other systems did not produce excess steam. The four systems simulated for this report show positive benefit cost ratios even under our conservative economic parameters and would provide a favorable investment under the right circumstances. Each individual installation will differ in its operating characteristics and energy requirements. Therefore, comprehensive feasibility studies must be performed at each facility to determine the most economically advantageous system. 75 references, 4 figures, 12 tables. (ERA citation 10:002067)

515,615
DE85000205/GAR PC **A02**/MF **A01**
Department of Energy, Washington, DC. Office of the Secretary.
Excerpts from Remarks by US Energy Secretary Donald Paul Hodel Before the National Independent Coal Operators Association.
28 Apr 84, 7p CONF-8404196-3-Exc.
National Independent Coal Operators' Association annual meeting, Lexington, KY, USA, 26 Apr 1984.

Secretary Hodel's talk dealt mainly with promotion of the use of coal in fossil-fuel power plants generating electric power. Coal and uranium remain the major power and expandable source of domestic energy to meet projected additional power generating capacity needs to the year 2000. The electrification of the US economy is expected to continue with a growth of 3.4% from 1983 to 1993. Therefore, as much as 400 gigawatts of additional capacity may be needed by 2000. He wants to expand exports of coal by more attention to selling. Public and private sectors need to work together to ensure that America is aggressive and competitive in world market, both in the production and rail transport of coal. He adheres to the administration position that more scientific information is needed before additional control of sulfur dioxide can be recommended. But he expects industry will install more air pollution control equipment, such as scrubbers. Also, he expects research on acid rain to be doubled. He also discussed research programs on the preparation and combustion of coal and on scubber developments to improve flue gas desulfurization and denitrification. Energy conservation, renewable energy sources and decontrol of natural gas prices were discussed briefly. (ERA citation 10:001806)

515,616
DE85000335/GAR PC **A05**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Solar Photochemical Process Engineering for Production of Fuels and Chemicals.
J. R. Biddle, D. B. Peterson, and T. Fujita. 1 May 84, 92p DOE/JPL-1060-72, JPL-PUB-84-31
Contract AM04-80AL13137
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The engineering costs and performance of a nominal 25,000 scmd (883,000 scfd) photochemical plant to produce dihydrogen from water have been studied. Two systems were considered, one based on flat-plate collector/reactors and the other on linear parabolic troughs. Engineering subsystems were specified including the collector/reactor, support hardware, field transport piping, gas compression equipment, and balance-of-plant (BOP) items. Overall plant efficiencies of 10.3 and 11.6% are estimated for the flat-plate and trough systems, respectively, based on assumed solar photochemical efficiencies of 12.9 and 14.6%. Because of the opposing effects of concentration ratio and operating temperature on efficiency, it was concluded that reactor cooling would be necessary with the trough system. Both active and passive cooling methods were considered. Capital costs and energy costs, for both concentrating and non-concentrating systems, were determined and their sensitivity to efficiency and economic parameters were analyzed. Results predict energy costs in the range of $34 to $55/10 exp 6 kJ ($36 to $59/10 exp 6 Btu) for the flat-plate system and $94 to $141/10 exp 6 kJ ($99 to $149/10 exp 6 Btu) for the trough system. The overall plant efficiency is the single most important factor in determining the cost of the fuel. Therefore, solar quantum conversion processes were reviewed for the purpose of identifying processes which promise better performance and lower costs. Operating and systems options, including operation at elevated temperatures and hybrid and coupled quantum-thermal conversion processes, were also briefly examined. (ERA citation 10:002080)

515,617
DE85000336/GAR PC **A05**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Review of Solar Fuel-Producing Quantum Conversion Processes.
D. B. Peterson, J. R. Biddle, and T. Fujita. 1 May 84, 87p DOE/JPL-1060-71, JPL-PUB-84-32
Contract AM04-80AL13137

The single most important factor in determining the cost of fuel produced by a commercial-scale solar photochemical plant is the overall efficiency which is limited primarily by the relatively low efficiency of the solar photochemical process. The results of that study are summarized. Because of the pivotal role of photochemical efficiency in determining the economic viability of fuel production, the current status and potential of fuel-producing solar photochemical processes are discussed in this report. Research has focused almost exclusively on splitting water to produce dihydrogen and is at a relatively early stage of development. Current emphasis is primarily directed toward understanding the basic chemistry underlying such solar quantum conversion processes. Theoretical analyses by various investigators predict a limiting thermodynamic efficiency of 31% for devices with a single photosystem operating with unfocused sunlight at 300 exp 0 K. When non-idealities are included, it appears unlikely that actual devices will have efficiencies greater than 12 to 15%. Observed efficiencies are well below theoretical limits. Cyclic homogeneous photochemical processes for splitting water have efficiencies considerably less than 1%. Efficiency can be significantly increased by addition of a sacrificial reagent; however, such systems are no longer cyclic and it is doubtful that they would be economical on a commercial scale. The observed efficiencies for photoelectrochemical processes are also low but such systems appear more promising than homogeneous photochemical systems. Operating and systems options, including operation at elevated temperature and hybrid and coupled quantum-thermal conversion processes, are also considered. (ERA citation 10:002079)

515,618
DE85000351/GAR PC **A07**/MF **A01**
Arizona Univ., Tucson. Dept. of Chemical Engineering.
Coal Pyrolysis in Flat Opposed Jet Combustion Configurations. Interim Technical Progress Report, May 30, 1984-August 31, 1984.
J. O. L. Wendt. 1984, 135p DOE/PC/50795-T2
Contract FG22-82PC50795
Thesis.
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Results from three different opposed flow situations are described, namely: (i) particle trajectories in isothermal, infinitely wide, infinitely spaced opposed jets, (ii) those in nonisothermal, infinitely wide, infinitely spaced impinging jets, and finally (iii) those in nonisothermal, infinitely wide, but finitely spaced impinging jets. The latter configuration is experimentally realized in the experimental portion of this project. In the simplified analytical isothermal situation, three distinct types of particle trajectories are possible. The relationship between particle density, particle diameter, gas viscosity, and the stretching rate of the flow fields determines whether the particle motion is underdamped, overdamped, or particles of the hypothetical nonisothermal situation. A computer program simulating particle behavior in the experimental configuration permits extrapolation of particle trajectories and subsequently particle time-temperature histories, given experimental gas species and temperature profiles. (ERA citation 10:000031)

515,619
DE85000424/GAR PC **A02**/MF **A01**
Colorado Univ. at Boulder. Dept. of Chemical Engineering.
Promoter Modifications of Catalytic Activity and Selectivity. Progress Report, April 1, 1984-October 1, 1984.
J. L. Falconer. 8 Oct 84, 15p DOE/ER/13217-1
Contract FG02-84ER13217

Catalytic activity and selectivity for CO and CO sub 2 hydrogenation on supported nickel catalysts were changed significantly by the addition of alkali promoters; the major factor in determining the change was the oxide support used. On most supports, alkali promoters decrease hydrogenation rates to varying degrees, apparently due to weakened hydrogen bonding. This results in lower methane turnover numbers and large olefin/paraffin ratios for CO hydrogenation. The rate of carbon hydrogenation is also dramatically reduced. For CO sub 2 hydrogenation, selectivity to CO product increases as overall conversion decreases with promoter concentration. On Ni/SiO sub 2 -Al sub 2 O sub 3 , however, turnover numbers increase for both CO and CO sub 2 hydrogenation. These changes and studies in which nickel loadings were varied show that the K/Ni ratio is not sufficient to determine the changes due to the promoter. The oxide support and the nickel loading also have major influences, apparently because much of the promoter reacts with the support. The promoter preparation and the promoter salt used have much less effect than the support and the potassium loading. (ERA citation 10:002046)

515,620
DE85000505/GAR PC **A12**/MF **A01**
Solar Energy Research Inst., Golden, CO.
Dissociated Methanol Citation. Final Report.
J. G. Finegold, G. P. Glinsky, and G. E. Voecks. Aug 84, 259p SERI/TR-235-2083
Contract AC02-83CH10093
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A system to vaporize and dissociate methanol on board an automobile was designed and fabricated. It was then integrated with a 2.5 liter, 4-cylinder engine for testing on an engine dynamometer. Engine dynamometer tests showed significant thermal efficiency advantage over gasoline at all speed-load points. At low speed and light load, which are typical operating conditions for passenger car engines, the fuel economy improvements were largest. The system was then modified slightly and installed in a 1980 Chevrolet Citation automobile, making it the first vehicle of its type in the world. Fuel economy improvements over baseline gasoline operation are high. Fuel economies of 13.3 km/L (31.3 mpg) and 11.4 km/L (26.8 mpg) were obtained at steady speed road load conditions of 65 km/h and 90 km/h, respectively. Methanol fuel economy over the EPA '74 CVS hot start city driving cycle was 7.74 km/L (18.2 mpg). Methanol fuel economy over the EPA highway fuel economy test was 10.2 km/L (24.0 mpg). We conclude that the dissociation of methanol on board a vehicle is technically feasible. Tests of the first prototype have documented very large improvements in energy economy relative to gasoline. Considerable research is still required before a decision can be made as to the extent of its advantages over liquid methanol. 19 references, 27 figures, 16 tables. (ERA citation 10:002583)

515,621
DE85000794/GAR PC **A25**/MF **A01**
International Coal Refining Co., Allentown, PA.
General Engineering Specifications for 6000 Tpd SRC-I Demonstration Plant.
1980, 580p DOE/OR/03054-T32
Contract AC05-78OR03054
Portions are illegible in microfiche products.

This volume continues with General Engineering specifications of equipment for the SRC-1 Demonstration Plant as follows: pipes (materials, fabrication and testing), values, control equipment and systems, measuring instruments, flowmeters, etc. (ERA citation 10:000026)

515,622
DE85000811/GAR PC **A03**/MF **A01**
California Univ., Santa Barbara. Dept. of Chemistry.
Studies Related to the Homogeneous Catalysis of the Water Gas Shift Reaction. Technical Progress Report, December 1, 1983-November 30, 1984.
P. C. Ford. 1984, 33p DOE/ER/70262-T2
Contract AT03-76ER70262
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Proposed are investigations related to the catalytic activation of carbon monoxide. These studies will be concerned with the design of catalysts for the water gas shift reaction and related processes such as the hydroformylation of olefins by homogeneous solution phase systems as well as by selected metal catalysts heterogenized by complexation to functional polymers. Also under investigation will be quantitative mechanistic aspects of reactions considered key to probable catalyst cycles. These are principally concerned with the fundamental chemistry of metal carbonyl and metal carbnyl hydride complexes including acid/base properties, reductive elimination, subetitution and cluster fragmentation reactions and the nucleophilic activation of metal coordinated carbonyls toward reaction with water or dihydrogen. Goal of these studies is to provide chemical guidelines for the molecular design of new and more efficient catalysts for the utilization of carbonaceous materials such as coal for the production of fuels and other organic chemicals. (ERA citation 10:000349)

515,623
DE85000827/GAR PC **A02/MF A01**
Battelle Pacific Northwest Labs., Richland, WA.
Development and Evaluation of Supercritical Fluid Chromatography/Mass Spectrometry for Polar and High Molecular Weight Coal Components.
E. K. Chess, and R. D. Smith. Jun 84, 8p PNL-SA-12298, CONF-840694-9
Contract AC06-76RL01830
AR and TD and surface coal gasification instrumentation projects contractors' meeting, Morgantown, WV, USA, 13 Jun 1984.

Scope of this program includes application of this instrumentation in support of synfuel process development. The high chromatographic resolution possible with fine (<75 mu m ID) capillary column supercritical fluid chromatography (SFC) is anticipated to allow the extension of high resolution mass spectrometry (MS) to the characterization of polar high molecular weight materials that cannot be separated by gas chromatography (GC). The program will involve the development of a new SFC/MS interface capable of allowing direct fluid injection (DFI) and supercritical fluid chromatographic introduction of a wide range of samples into the ion source of a double-focusing, high resolution mass spectrometer. The initial design for the interface has been completed, and the new ion source has been fabricated and successfully tested. Initial DFI experiments using nonpolar supercritical fluids, such as pentane and carbon dioxide, will commence following fabrication of the SFC/MS interface, currently under construction. The product of this program is expected to provide improved characterization of complex high molecular weight and polar fuel components, and to determine the feasibility of using SFC/MS or DFI/MS methods for on-line characterization of synfuel processes. (ERA citation 10:000976)

515,624
DE85001028/GAR PC **A09/MF A01**
Jet Propulsion Lab., Pasadena, CA.
Direct Coal Combustion Data Handbook.
E. J. Dutzi, J. F. Ferrall, J. E. McCarthy, N. R. Moore, and A. Walton. 1 Jan 82, 191p DOE/RA/50624-T2
Contract AI01-81RA50624
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This handbook has been compiled as part of a Jet Propulsion Laboratory (JPL) effort to support the Fossil Energy Office of the US Department of Energy (DOE) in programmatic decision making. The handbook provides: (1) Systems-level comparisons among advanced technology systems for generating electricity via direct coal combustion. (2) Descriptions of key R and D projects dealing with advanced direct coal combustion systems. (3) Descriptions of the status of development of key subsystems and components. (4) A summary of current and projected environmental requirements applicable to new generating facilities. The work was performed under an Interagency Agreement between DOE and the National Aeronautics and Space Administration. (ERA citation 10:001830)

515,625
DE85001217/GAR PC **A08/MF A01**
Parsons (Ralph M.) Co., Pasadena, CA.
6000 Tpd SRC-I Demonstration Plant Gas Systems. Design Baseline Package. Volume 10.
Jan 83, 156p DOE/OR/03054-T27-V.10
Contract AC05-78OR03054
Portions are illegible in microfiche products.

Volume 10 of T27 contains information on the Claus process for recovering sulfur from the fuel gas (or synthesis gas) and on the Beavon process for treating the Claus process tail gas to purify it sufficiently for emission to the atmosphere. Both processes are proprietary and detailed information is not included in this volume. (ERA citation 10:000020)

515,626
DE85001240/GAR PC **A14/MF A01**
International Coal Refining Co., Allentown, PA.
6000 Tpd SRC-I Demonstration Plant Gas Systems. Design Baseline Package, Volume 7.
20 Oct 82, 322p DOE/OR/03054-T27-V.7
Contract AC05-78OR03054
Portions are illegible in microfiche products.

The Shift Section is designed to convert a minimum of 95 percent of the carbon monoxide in the syngas to hydrogen. This results in a product gas, after acid gas removal, containing a total of 77.5 MMSCFD hydrogen plus carbon monoxide with an overall hydrogen purity of approximately 96 percent. The design is based on a single operating train as the equipment will have a very high on-stream factor. The particulate-free raw syngas from the Gasification Section is compressed to the design pressure of 810.0 psia prior to processing in the Shift Section. The compressed raw syngas is then mixed with the required volume of superheated steam, heated by exchange with the first shift reactor effluent, and shifted in three stages with interstage cooling. The effluent from the third stage reactor is cooled to 100 exp 0 F for further processing in the Selexol Unit. The hydrogen compression unit compresses a portion of the makeup hydrogen gas stream from the Selexol unit (SRC makeup hydrogen), the recycle hydrogen gas stream from the hydrogen purification unit (HPU), and the bypass recycle hydrogen-rich gas stream from the DEA Unit. The multi-service reciprocating compressor compresses the SRC makeup hydrogen gas stream in the first section with two compressor stages. The recycle and the bypass hydrogen are compressed in the second section with two separate single stages. Design of the compression section is based on three 50% identical trains, two operating and one spare. Each train consists of a triple service reciprocating compressor servicing makeup hydrogen, recycle hydrogen and bypass hydrogen compressions. All three hydrogen streams, after being discharged from the compressors are combined and are ready for processing in the SRC Process Unit. (ERA citation 10:000017)

515,627
DE85001312/GAR PC **A09/MF A01**
Rhode Island Univ., Kingston. Dept. of Chemical Engineering.
Study of Multiphase Flow Useful to Understand Scaleup of Coal Liquefaction Reactors. 1981-1984 Final Report.
H. N. Knickle. Sep 84, 185p DOE/PC/40797-T4
Contract FG22-81PC40797
Portions are illegible in microfiche products. Original copy available until stock is exhausted.

Research over a three year time span involved the study of multiphase flow useful to understanding the scaleup of coal liquefaction reactors. We attempted to establish the flow patterns and their boundaries in which a direct coal liquefaction, large diameter, bubble column operates. A flow map has been proposed in which coal slurry properties can be input to determine the flow pattern boundaries at reactor operating conditions. Gas holdup and bubble diameters have been measured under different conditions of gas and liquid flow rate. These have been used to determine interfacial area in bubble columns. An equation for the estimation of interfacial area in the bubble-slug flow pattern has been proposed. It has also been established that gas holdup and thus interfacial area depends strongly on the gas distribution in the column. Porous plate gas distributors can yield gas holdups twice as large as sieve plate distributors. Measurements using aqueous solutions (carboxy methyl cellulose) indicate that non-Newtonian solutions can affect the gas holdup, the transition from bubble to bubble-slug flow, and the interfacial area. These experiments have been analyzed and equations for gas holdup and interfacial area have been proposed. Analysis of these experiments involved modelling the bubble slug flow pattern with limited success. In highly viscous systems slug flow can reappear and modelling results for this pattern under highly viscous conditions were successful resulting in an equation for the shear rate in the bubble column. This last model also predicted gas holdup with reasonable accuracy. 167 references. (ERA citation 10:001715)

515,628
DE85001408/GAR PC **A04/MF A01**
Cooperative Inst. for Research in Environmental Science, Boulder, CO.
Environmental Chemistry of Oil Shale Development. Interim Technical Progress Report, January 1-September 30, 1984.
1984, 61p DOE/ER/60121-2
Contract AC02-83ER60121
Portions are illegible in microfiche products.

Progress is reported in the following areas: (1) thermal properties of porous media; (2) release mechanisms of soluble pollutants; (3) determination of distribution coefficients appropriate for modeling contaminant migration from energy residual wastes; (4) treatment and volatilization of organic compounds in aqueous energy residuals; and (5) microbial role in trace element releases from porous energy residuals. (ERA citation 10:001931)

515,629
DE85001662/GAR PC **A05/MF A01**
Parsons (Ralph M.) Co., Pasadena, CA.
6000 Tpd SRC-I Demonstration Plant Gas Systems. Design Baseline Package. Volume 4.
Oct 82, 80p DOE/OR/03054-T27-V.4
Contract AC05-78OR03054
Portions are illegible in microfiche products.

The Methanation Unit is designed to convert the carbon oxides in the treated make-up hydrogen to methane. This results in a product gas containing 26.26 MMSCFD hydrogen with an overall hydrogen purity of approximately 94.5 percent (dry basis) and a maximum carbon oxides concentration of 20 ppmv. The design is based on a single operating train as the equipment will have a very high on-stream factor. The treated make-up hydrogen feed from the Selexol Unit is heated by exchange with the Methanator effluent and then desulfurized in a two-stage desulfurization step. The desulfurized hydrogen stream is then methanated in the methanator. The effluent from the methanator is then cooled to 100 exp 0 F and sent to the Hydrocracker Unit for further processing. The treated make-up hydrogen from the Selexol Unit enters the Methanation Unit battery limit at a pressure of 670 psia and a temperature of 60 exp 0 F. The composition of the make-up hydrogen feed to the Methanation Unit is given in Table 1. As the sulfur content of the feed gas is very low, a significant temperature rise in the desulfurizers is not expected. The composition of the Desulfurizer No. 2 effluent (methanator feed) is given in Table 2. Desulfurized make-up hydrogen then enters the Methanator (R-15653). The exothermic methanation reaction then occurs over the catalyst bed raising the gas temperature to 912 exp 0 F (SOR) and 932 exp 0 F (EOR). The composition of the methanator effluent is given in Table 3. (ERA citation 10:000015)

515,630
DE85001688/GAR PC **A11/MF A01**
Arizona Univ., Tucson. Dept. of Chemical Engineering.
Modified Extruder for Feeding Fine-Ground Cellulosic Slurries to Pressure Systems. Final Report, 1978-1980.
D. H. White, D. Wolf, N. R. Schott, M. Chehab, and I. Iregbulum. 1980, 230p DOE/ET/20067-T1
Contract AS05-78ET20067
Portions are illegible in microfiche products.

A plasticating extruder was adapted to be an extruder-feeder for feeding concentrated cellulosic wood flour slurries into pressure systems. It is for use in biomass liquefaction catalyzed by sodium carbonate at 3000 psi and a temperature of about 350 exp 0 C. Experimental data were obtained showing successful pressurizing up to 8500 psi for slurry concentrations up to 60 weight percent wood flour in a viscous liquid. The basic concept is that the viscous liquid should be recycled vacuum bottoms from the fractionation of the wood oil made by biomass liquefaction. Wood oil vacuum bottoms were not available when this work started, and only small quantities near the end for laboratory determination of viscosities and other properties. Consequently, a series of mixtures of low molecular weight and higher molecular weight polyethylenes were used as model fluids to investigate the effect of viscosity of the carrier fluid in wood flour slurries. The rheology of wood oils, carrier fluids and the various resultant slurries was determined. These results were used in predicting output rates, pressures developed at the extruder-feeder outlet, power requirements, viscous dissipation and other parameters in operating the experi-

mental extruder-feeder. Much technical data were developed to understand the parameters of feeding finely-ground wood flour slurries into 3000 psi pressure systems. Practical extruder-feeder output rates at reasonable power requirements were demonstrated. When sufficient quantities of vacuum bottoms from wood oil fractination in the Albany, Oregon facility are available, their use in wood flour from slurries will be checked out experimentally. 44 references, 55 figures, 54 tables. (ERA citation 10:000350)

515,631
DE85001825/GAR PC **A02/MF A01**
National Inst. for Petroleum and Energy Research, Bartlesville, OK.
Utilization Research. Volume III. Quarterly Technical Report, April 1-June 30, 1984.
29 Aug 84, 19p NIPER-15-Vol.3
Contract FC01-83FE60149

Volume III contains progress reports for the following tasks: (1) diesel fuel quality criteria; (2) direct utilization of aromatic feedstocks; (3) diesel exhaust characterization; and (4) coal slurry fuels for diesel engines. (ERA citation 10:001885)

515,632
DE85001891/GAR PC **A10/MF A01**
Southern Illinois Univ. at Carbondale. Coal Extraction and Utilization Research Center.
Critical Points in the Coal Fuel Cycle: A Modeling Analysis. Final Report, 1 July 1983-30 June 1984.
D. Arey, D. Baumann, G. Boyd, J. Crenshaw, and B. Dziegielewski. 1984, 213p DOE/FE/60339-T3
Contract FC22-83FE60339
Portions are illegible in microfiche products. Original copy available until stock is exhausted.

There are two basic perspectives on the use of simulation models by an organization such as the CTL. The CTL has its own program of research with particular engineering and scientific projects designed primarily to deal with the problems inherent in using coal. The focus of most of the CTL experimental effort has been on the question of sulfur in coal. This program of research has intrinsic value but also must look outward beyond the laboratory boundaries for direction and for use of its research results. Given these two perspectives, one looking inward at the operations and activities of the CTL itself, the other looking outward for markets for its output and for users of its services, there are three possible uses of simulation modeling: (1) project analysis and technology assessment; (2) research program analysis; and (3) legislative and regulatory impact analysis. The purpose of this project was to see if it was feasible for an organization such as the Coal Technology Laboratory to make use of mathematical modeling as a research tool in studying the post-mining coal fuel cycle. To accomplish this goal three research studies, one in each of the above areas, were undertaken by members of the research team. The project demonstrated the feasibility and the advisability of continuation of a capability on the part of the CTL to use a simulation model, CSTM, to analyze projects and technological change, programs of research targeted at sulfur reduction, and possible legislative or regulatory changes. Such a capability, once fully developed and refined could be used both for analysis of CTL projects and programs and for those developed by entities other than CTL. (ERA citation 10:001808)

515,633
DE85001914/GAR PC **A02/MF A01**
Solar Energy Research Inst., Golden, CO.
Hydrogen from Solar Energy.
R. G. Nix. Jul 84, 10p SERI/TP-251-2424, CONF-840797-1
Contract AC02-83CH10093
IEA hydrogen annex workshop, Toronto, Ontario, Canada, 12 Jul 1984.

This paper describes those portions of the Photo/Thermochemical Research Program that possibly apply to the production of hydrogen from sources such as water or hydrogen sulfide. That research centers around understanding high flux solids decomposition reactions and how to best exploit photoreactions so the energy contained in the entire solar spectrum is used. 2 references, 4 figures. (ERA citation 10:000336)

515,634
DE85002138/GAR PC **A06/MF A01**
Catalytic, Inc., Wilsonville, AL.
Wilsonville Advanced Coal Liquefaction Research and Development Facility, Wilsonville, Alabama. Wilsonville ACL R and D Facility Material Balance Procedure. Topical Report No. 11.
Sep 84, 120p DOE/PC/50041-41
Contract AC22-82PC50041
Portions are illegible in microfiche products. Original copy available until stock is exhausted.

Prior to 1978, the Wilsonville Advanced Coal Liquefaction facility material balance surrounded only the thermal liquefaction unit and involved analyses of only the slurry stream and individual gas streams. The distillate solvent yield was determined by difference. Subsequently, several modifications and additional process units were introduced to this single unit system. With the inclusion of the deashing unit in 1978 and the catalytic hydrogenation unit in 1981, the process has evolved into a sophisticated two-stage coal liquefaction process and has the potential for various modes of integration. This report presents an elemental balancing procedure and a simplified presentation format that is sufficiently flexible to meet current and future needs. The development of the elemental balancing technique and the relevant computer programs to handle the calculations have been addressed. This will be useful in modelling individual unit performance as well as determining the impact of each unit on the overall liquefaction system, provided the units are on a steady-state basis. Five different material balance envelopes are defined. Three of these envelopes pertain to the individual units (the thermal liquefaction or TL unit, the Critical Solvent Deashing or CSD unit and the H-Oil Ebullated Bed Hydrotreating or HTR unit). The fourth or single stage material balance envelope combines the TL and CSD units. The fifth envelope is the two-stage configuration combining all three units. 3 references. (ERA citation 10:001716)

515,635
DE85002161/GAR PC **A02/MF A01**
National Inst. for Petroleum and Energy Research, Bartlesville, OK.
Strategic Petroleum Reserve Supporting Research. Quarterly Report, April 1-June 30, 1984.
4 Jul 84, 13p DOE/BC/99880-3
Contract AC19-84BC99880
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The distillation and complete analysis of 8 crude oils were accomplished. Inspection tests on all GL83- and seven GL84- samples were completed. Partial ASTM D-2892 distillation capability has been obtained in-house. A freeze point capability has been obtained. All German-derived crude oils have been analyzed for C, H, and N ratios. Work continues to improve the ASTM D-1160 distillation ability. Asphaltenes were extracted from several samples for stable isotope ratio analysis. The NMR is now operational and a Dohrmann microcoulometer for measuring organic and inorganic chlorides in crude oils has been installed and is operational. 7 tables. (ERA citation 10:001881)

515,636
DE85002181/GAR PC **A05/MF A01**
National Inst. for Petroleum and Energy Research, Bartlesville, OK.
Processing and Thermodynamics Research. Volume II. Quarterly Technical Report, April 1-June 30, 1984.
29 Aug 84, 80p NIPER-15-Vol.2
Contract FC01-83FE60149

Volume II contains the following progress reports in the areas of processing and thermodynamics: (1) thermodynamic properties of organic nitrogen compounds that occur in shale oil and heavy petroleum; (2) thermophysical and thermochemical properties of organic compounds derived from fossil substances; (3) stability and processing research for crudes, intermediate process streams, and finished fuels; (4) chemical characterization of heavy ends of light petroleum, of heavy petroleum, and of liquids derived from other fossil sources; (5) thermophysical properties of real and synthetic fluid mixtures derived from fossil substances; (6) fuel trends and analyses; and (7) chemistry of contaminated petroleum fuels. (ERA citation 10:001861)

515,637
DE85002260/GAR PC **A02/MF A01**
Department of Energy, Washington, DC. Office of Oil and Gas.
Natural Gas Monthly Report, September 1981. Energy Data Report.
D. M. Hinton. 12 Jan 82, 1p DOE/EIA-0130(81/09)

Monthly marketed production of natural gas in each of eighteen States, all other states, and all states combined is reported. Also given are imports to and exports from the United States. Data cover each of the two most recent months available, the corresponding month of the previous year, and the current and previous year-to-date. Volume is given in cubic feet and cubic feet per day. Marketed production of natural gas represents gross withdrawals less gas used for repressuring and quantities vented and flared. Data from the previous year are revised. Some of the most recent data are estimated. Prior to November 1979, this publication was titled Marketed Production, Imports and Exports of Natural Gas. 1 table. (ERA citation 10:000212)

515,638
DE85002261/GAR PC **A02/MF A01**
Department of Energy, Washington, DC. Office of Oil and Gas.
Natural Gas Monthly Report, October 1981. Energy Data Report.
D. M. Hinton. 4 Feb 82, 2p DOE/EIA-0130(81/10)

Monthly marketed production of natural gas in each of eighteen states, all other states, and all states combined is reported. Also given are imports to and exports from the United States. Data cover each of the two most recent months available, the corresponding month of the previous year, and the current and previous year-to-date. Volume is given in cubic feet and cubic feet per day. Marketed production of natural gas represents gross withdrawals less gas used for repressuring and quantities vented and flared. Data from the previous year are revised. Some of the most recent data are estimated. Prior to November 1979, this publication was titled Marketed Production, Imports and Exports of Natural Gas. 1 table. (ERA citation 10:000213)

515,639
DE85002275/GAR PC **A02/MF A01**
Department of Energy, Washington, DC. Office of Oil and Gas.
Energy Data Report: Natural Gas Monthly Report, November 1981.
D. M. Hinton. 4 Mar 82, 2p DOE/EIA-0130(81/11)
Portions are illegible in microfiche products.

This report provides information on the marketed production of natural gas and on imports and exports of natural gas. Data are tabulated for the current month, preceding month, previous year, and year to date. Individual totals are presented for the following states: Alabama, Alaska, Arkansas, California, Colorado, Florida, Kansas, Louisiana, Michigan, Mississippi, Montana, New Mexico, North Dakota, Oklahoma, Texas, Utah, West Virginia, and Wyoming. (ERA citation 10:000214)

515,640
DE85002278/GAR PC **A02/MF A01**
Department of Energy, Washington, DC. Office of Oil and Gas.
Energy Data Report: Prices and Margins of No. 2 Distillate Fuel Oil. Monthly Report, October 1982.
A. Whatley. 20 Dec 82, 8p DOE/EIA-0013(82/10)
Portions are illegible in microfiche products.

Data are presented on the average prices and gross margins for the refining, reselling, and retailing sectors of the No. 2 distillate fuel oil market. Data are tabulated on prices and sales volumes of No. 2 fuel oil and No. 2 diesel fuel for residential, industrial/commercial, institutional/utility, other ultimate consumer sales, and nonultimate consumer sales. A brief discussion of the sampling and estimation procedures used in this report appears in the appendix. (ERA citation 10:000190)

515,641
DE85002279/GAR PC **A02/MF A01**
Department of Energy, Washington, DC. Office of Oil and Gas.
Energy Data Report: Prices and Margins of No. 2 Distillate Fuel Oil. Monthly Report, November 1982.
A. Whatley. 18 Jan 83, 8p DOE/EIA-0013(82/11)
Portions are illegible in microfiche products.

Data are presented on the average prices and gross margins for the refining, reselling, and retailing sectors of the No. 2 distillate fuel oil market. Data are tabulated on prices and sales volumes of No. 2 fuel oil and No. 2

diesel fuel for residential, industrial/commercial, institutional/utility, other ultimate consumer sales, and nonultimate consumer sales. A brief discussion of the sampling and estimation procedures used in this report appears in the appendix. (ERA citation 10:000191)

515,642
DE85002280/GAR PC **A02/MF A01**
Department of Energy, Washington, DC. Office of Oil and Gas.
Energy Data Report: Natural Gas Monthly Report, January 1982.
D. M. Hinton. 3 May 82, 2p DOE/EIA-0130(82/01)
Portions are illegible in microfiche products.

This report provides information on the marketed production of natural gas and on imports and exports of natural gas. Data are tabulated for the current month, preceding month, previous year, and year to date. Individual totals are presented for the following states: Alabama, Alaska, Arkansas, California, Colorado, Florida, Kansas, Louisiana, Michigan, Mississippi, Montana, New Mexico, North Dakota, Oklahoma, Texas, Utah, West Virginia, and Wyoming. (ERA citation 10:001894)

515,643
DE85002281/GAR PC **A02/MF A01**
Department of Energy, Washington, DC. Office of Oil and Gas.
Energy Data Report: Natural Gas Monthly Report, February 1982.
D. M. Hinton. 2 Jun 82, 2p DOE/EIA-0130(82/02)
Portions are illegible in microfiche products.

This report provides information on the marketed production of natural gas and on imports and exports of natural gas. Data are tabulated for the current month, preceding month, previous year, and year to date. Individual totals are presented for the following states: Alabama, Alaska, Arkansas, California, Colorado, Florida, Kansas, Louisiana, Michigan, Mississippi, Montana, New Mexico, North Dakota, Oklahoma, Texas, Utah, West Virginia, and Wyoming. (ERA citation 10:001895)

515,644
DE85002282/GAR PC **A02/MF A01**
Department of Energy, Washington, DC. Office of Oil and Gas.
Energy Data Report: Natural Gas Monthly Report, March 1982.
D. M. Hinton. 28 Jun 82, 2p DOE/EIA-0130(82/03)
Portions are illegible in microfiche products.

This report provides information on the marketed production of natural gas and on imports and exports of natural gas. Data are tabulated for the current month, preceding month, previous year, and year to date. Individual totals are presented for the following states: Alabama, Alaska, Arkansas, California, Colorado, Florida, Kansas, Louisiana, Michigan, Mississippi, Montana, New Mexico, North Dakota, Oklahoma, Texas, Utah, West Virginia, and Wyoming. (ERA citation 10:001896)

515,645
DE85002283/GAR PC **A02/MF A01**
Department of Energy, Washington, DC. Office of Oil and Gas.
Energy Data Report: Natural Gas Monthly Report, April 1982.
D. M. Hinton. 2 Aug 82, 2p DOE/EIA-0130(82/04)
Portions are illegible in microfiche products.

This report provides information on the marketed production of natural gas and on imports and exports of natural gas. Data are tabulated for the current month, preceding month, previous year, and year to date. Individual totals are presented for the following states: Alabama, Alaska, Arkansas, California, Colorado, Florida, Kansas, Louisiana, Michigan, Mississippi, Montana, New Mexico, North Dakota, Oklahoma, Texas, Utah, West Virginia, and Wyoming. (ERA citation 10:001897)

515,646
DE85002284/GAR PC **A02/MF A01**
Department of Energy, Washington, DC. Office of Oil and Gas.
Energy Data Report: Natural Gas Monthly Report, May 1982.
D. M. Hinton. 31 Aug 82, 2p DOE/EIA-0130(82/05)
Portions are illegible in microfiche products.

This report provides information on the marketed production of natural gas and on imports and exports or natural gas. Data are tabulated for the current month, preceding month, previous year, and year to date. Individual totals are presented for the following states: Alabama, Alaska, Arkansas, California, Colorado, Florida, Kansas, Louisiana, Michigan, Mississippi, Montana, New Mexico, North Dakota, Oklahoma, Texas, Utah, West Virginia, and Wyoming. (ERA citation 10:001898)

515,647
DE85002290/GAR PC **A04/MF A01**
Department of Energy, Washington, DC. Office of Coal, Nuclear, Electric and Alternate Fuels.
Cost and Quality of Fuels for Electric Utility Plants, November 1981.
25 Mar 82, 67p DOE/EIA-0075(81/11)
Portions are illegible in microfiche products.

Tabulated data are presented on coal, fuel oil, and gas consumption at US steam-electric power plants and at peaking power plants. Only fossil-fueled plants with a combined capacity of 25 megawatts or greater are included. Information is presented on the monthly fuel cost, quality, and quantity by geographic region and state. Information is also provided at the plant level by named utilities in each state. (ERA citation 10:000195)

515,648
DE85002294/GAR PC **A02/MF A01**
Department of Energy, Washington, DC. Office of Oil and Gas.
Energy Data Report: Prices and Margins of No. 2 Distillate Fuel Oil. Monthly Report, December 1981.
A. Whatley. 22 Feb 82, 8p DOE/EIA-0013(81/12)
Portions are illegible in microfiche products.

Data are presented on the average prices and gross margins for the refining, reselling, and retailing sectors of the No. 2 distillate fuel oil market. Data are tabulated on prices and sales volumes of No. 2 fuel oil and No. 2 diesel fuel for residential, industrial/commercial, institutional/utility, other ultimate consumer sales, and nonultimate consumer sales. A brief discussion of the sampling and estimation procedures used in this report appears in the appendix. (ERA citation 10:000188)

515,649
DE85002328/GAR PC **A02/MF A01**
Department of Energy, Washington, DC. Office of Oil and Gas.
Energy Data Report: Prices and Margins of No. 2 Distillate Fuel Oil. Monthly Report, January 1982.
A. Whatley. 22 Mar 82, 8p DOE/EIA-0013(82/01)
Portions are illegible in microfiche products.

Data are presented on the average prices and gross margins for the refining, reselling, and retailing sectors of the No. 2 distillate fuel oil market. Data are tabulated on prices and sales volumes of No. 2 fuel oil and No. 2 diesel fuel for residential, industrial/commercial, institutional/utility, other ultimate consumer sales, and nonultimate consumer sales. A brief discussion of the sampling and estimation procedures used in this report appears in the appendix. (ERA citation 10:000189)

515,650
DE85002353/GAR PC **A04/MF A01**
Department of Energy, Washington, DC. Office of Oil and Gas.
Model Documentation of the Gas Analysis Modeling System. Volume 1. Model Overview.
Aug 84, 52p DOE/EIA-0450/1-V.1
Portions are illegible in microfiche products.

This is Volume 1 of three volumes of documentation for the Gas Analysis Modeling System (GAMS) developed by the Analysis and Forecasting Branch, Reserves and Natural Gas Division, Office of Oil and Gas, Energy Information Administration (EIA), US Department of Energy. This document is a non-mathematical description of the GAMS system, and is written for an audience with a technical understanding of applied statistical/applied mathematics modeling. (ERA citation 10:002425)

515,651
DE85002361/GAR PC **A17/MF A01**
Department of Energy, Washington, DC. Office of Oil and Gas.
Assessment of Principal Oil and Gas Data Series of the Energy Information Administration.
Aug 84, 381p DOE/EIA-0491
Portions are illegible in microfiche products.

This report focuses on monthly data from 1977 through the period September to November 1982. More recent data, which were being revised while the report was being prepared, are not included. The report differs from the previous efforts noted above in three major respects. First, the focus is exclusively on volumes and prices of crude oil, petroleum products, and natural gas. Second, the data series selected for assessment are those comprising the first data derived monthly estimates published by the EIA. Analytic estimates based on past experience rather than data derived through EIA's several data systems are published in the monthly publications with an e. These estimates are later revised as figures are determined through the data systems. Values selected for assessment in this report are the first published non-e figures. In previous assessment reports, final values were used. Finally, the results contained in this report have been shared with appropriate operational offices within EIA. In some cases, those offices have planned follow-up activities to further improve their data. These activities are described in this report. 142 figures, 102 tables. (ERA citation 10:000204)

515,652
DE85002385/GAR PC **A04/MF A01**
Los Alamos National Lab., NM.
Laser-Based Diagnostics for Coal Gasification Instrumentation.
D. J. Taylor, T. R. Loree, A. Hartford, and J. J. Tiee.
1984, 59p LA-UR-84-3292
Contract W-7405-ENG-36
Portions are illegible in microfiche products.

In this program the investigators have investigated the suitability of a number of optical diagnostic techniques for nonintrusive real-time measurements of species concentrations and temperatures of coal gasification streams. They have identified and evaluated several promising techniques including coherent Raman spectroscopy, laser-induced breakdown spectroscopy, and laser-induced fluorescence. They emphasize that these are complementary, rather than competing, diagnostic technologies, as each can provide a different class of data for gasifier operation. The results of their gasifier field tests and supporting laboratory work on these diagnostic techniques have been summarized and recommendations for continued work on optical diagnostics for coal gasification streams are presented. 12 references, 17 figures. (ERA citation 10:001736)

515,653
DE85002448/GAR PC **A07/MF A01**
Department of Energy, Washington, DC. Office of Energy Markets and End Use.
Monthly Energy Review, June 1984.
26 Sep 84, 134p DOE/EIA-0035(84/06)

This report presents current data on production, consumption, stock, imports, exports, and prices of the principal energy commodities in the United States. Also included are data on international production of crude oil, consumption of petroleum products, petroleum stocks, and production of electricity from nuclear-powered facilities. Energy commodities include petroleum, natural gas, coal, nuclear, and electric power. Energy production during June 1984 totaled 5.4 quadrillion Btu, a 10.8% increase compared to the level of production during June 1983. Coal production increased 23.5%, natural gas production was up 15.2%, and petroleum production increased 1.4%. Production of all other forms of energy combined decreased 1.0% compared to production 1 year earlier. (ERA citation 10:001865)

515,654
DE85002460/GAR PC **A02/MF A01**
Oak Ridge National Lab., TN.
Photosynthetic Water Splitting.
E. Greenbaum. 1984, 3p CONF-8410184-1
Contract AC05-84OR21400
GRI basic research contractor's review meeting on gaseous fuel synthesis from inorganic resources, Schaumberg, IL, USA, 17 Oct 1984.

Algae photosynthesis is a key areas of research for the production of gaseous fuels from inorganic resources. Absolute energy and quantum conversion efficiencies have been measured for five green algae species. Wild Chlamydomonas reinhardtii strains were subject to anaerobiosis, CO sub 2 deprivation, and irradiation in order to increase H sub 2 and/or O sub 2 photoproduction yields. (ERA citation 10:002029)

515,655
DE85002492/GAR PC **A05/MF A01**
Massachusetts Inst. of Tech., Cambridge.
Plasticity, Agglomeration and Volatiles Secondary Reactions in Coal Pyrolysis. Annual Report, September 10, 1982-February 29, 1984.
J. B. Howard, W. S. Fong, M. A. Serio, B. R. Beitz, and R. B. Lennox. Apr 84, 81p FE-MIT-19207-4
Contract AC21-82MC19207
Portions are illegible in microfiche products.

The overall objective of this research is to obtain, for conditions pertinent to modern coal gasification practice, improved basic understanding of coal plasticity, coal particle agglomeration, and secondary reactions of freshly formed coal pyrolysis tars. Development and construction of a final, first generation version of a high temperature, fast response coal viscometer have been completed. The viscosity of a Pittsburgh coal under a heating rate of a few hundred K/s was found to be in the range 10 exp 2 to 10 exp 4 poises. A systematic study of homogeneous and heterogeneous secondary reactions of tar has been completed, using a two-stage tubular reactor. A thin bed of coal, diluted with sand to prevent agglomeration, is pyrolyzed in the upstream reactor (reactor-1) at a low heating rate (3 exp 0 C/min) in order to produce fresh tars at temperatures (<500 exp 0 C) unfavorable to secondary reactions. These tars (and other volatiles) are then swept with carrier gas, usually helium, to the downstream (reactor-2) stage which is held isothermal at a temperature between 500 and 900 exp 0 C, and then to product traps. In the second stage, the separate effects of temperature (500 to 900 exp 0 C) and residence time (0.6 to 1.1 s) on homogeneous and heterogeneous tar secondary reactions were studied at 0.3 to 1.3 atm (gauge) pressure in helium. Selected runs were done at longer residence times (up to 3.9 s) for homogeneous experiments and in CO sub 2 atmospheres (1 to 5 atm, gauge) for heterogeneous experiments with active carbon. Gases and light oils were analyzed by gas chromatography. Tars were analyzed by ^{1}H-NMR, gel permeation chromatography, column chromatography, and elemental analysis. Surface areas and pore size distributions of char and active carbons were respectively measured by N sub 2 adsorption and Hg porosimetry. Results are discussed. 61 references, 35 figures, 5 tables. (ERA citation 10:001733)

515,656
DE85002496/GAR PC **A02/MF A01**
Brigham Young Univ., Provo, UT. Combustion Lab.
Fundamental Combustion Studies of Low-Rank Coal Slurries. Monthly Progress Report, 1 October 1984-31 October 1984.
G. J. Germane, and L. D. Smoot. 15 Nov 84, 3p
DOE/FC/10614-T12
Contract AC18-84FC10614

This month's accomplishments are presented for the following tasks: (1) coal slurry characterization; (2) slurry spray studies; and (3) combustion installation and instrumentation. Some of the highlights are: (1) rheological studies of the lignite coal slurry produced at 300 exp 0 C were conducted at shear rates of 200 to 600 sec exp -1 using a capillary viscometer; (2) some slurries exhibited shear thinning behavior at high shear rates; (3) the apparent viscosity of a 55/45 lignite/water slurry was about 330 cp at a shear rate of 440 sec exp -1 ; (4) a reactor section constructed of composite material, with flat plane windows for optical access to the slurry spray, was completed; (5) preliminary spray tests with water and atomizing air using an externally atomizing slurry nozzle were performed to help finalize the design of the spray test apparatus and to demonstrate capability to isolate regions of the spray for particle size, velocity and trajectory measurements; (6) methods of attachment of electric wall heaters to the combustion chamber are being studied to maximize effectiveness of the heater. (ERA citation 10:001767)

515,657
DE85002506/GAR PC **A07/MF A01**
Department of Energy, Washington, DC. Office of Oil and Gas.
Petroleum Marketing Monthly, August 1984.
1 Nov 84, 134p DOE/EIA-0380(84/08)
Portions are illegible in microfiche products.

This report presents monthly summaries of petroleum product statistics for the US Petroleum Administration for Defense (PAD) Districts, and individual States. Four types of petroleum product statistics are included: sale prices, sale volumes, percentages of product sales, and first sales of products for consumption. Salient statistics are highlighted in a summary section, and each of the four subjects are treated in detail in other sections. The first tables in each of the first three sections provide national-level statistics on sales of the various products to end-users and for resale. The following tables provide finer geographic and type of seller detail and are grouped by product, beginning with motor gasoline and ending with either residual fuel oil or propane. The majority of the tables show data for the report month and previous month for the current year. Data on motor gasoline aviation fuel, jet engine fuel, kerosene, distillate fuel oils, residual fuel oils, and propane are included. (ERA citation 10:001871)

515,658
DE85002515/GAR PC **A07/MF A01**
Department of Energy, Washington, DC. Office of Oil and Gas.
Petroleum Marketing Monthly, August 1984.
1 Nov 84, 133p DOE/EIA-0380(84/08)
Portions are illegible in microfiche products.

This report presents monthly summaries of petroleum product statistics for the US, Petroleum Administration for Defense (PAD) Districts, and individual states. Four types of petroleum product statistics are included: sale prices, sale volumes, percentages of product sales, and first sales of products for consumption. Salient statistics are highlighted in a summary section, and each of the four subjects are treated in detail in other sections. The first tables in each of the first three sections provide national-level statistics on sales of the various products to end-users and for resale. The following tables provide finer geographic and type of seller detail and are grouped by product, beginning with motor gasoline and ending with either residual fuel oil or propane. The majority of the tables show data for the report month and previous month for the current year. Data on motor gasoline, aviation fuel, jet engine fuel, kerosene, distillate fuel oils, residual fuel oils, and propane are included. (ERA citation 10:000203)

515,659
DE85002522/GAR PC **A07/MF A01**
Department of Energy, Washington, DC. Office of Coal, Nuclear, Electric and Alternate Fuels.
Coal Production, 1983.
Oct 84, 144p DOE/EIA-0118(83)

Highlights of the 1983 coal production and related data collected by the Energy Information Administration from mines that produced 10,000 or more short tons are: Coal production declined by 6.7% to 776.6 million short tons; The number of active mines decreased by 16.9% to 3405; The average mine price dropped by 4.7% to $25.98 per short ton; Productivity increased by 18.5% to 2.50 short tons per miner per hour; Employment was down 19.1% to 175,642; The percent utilization of US coal mines decreased slightly to 89.0%; Recoverable reserves at active mines decreased by 6.9% to 24.5 billion short tons; and The Demonstrated Reserve Base of US coal increased 6.6 billion short tons from the beginning of 1982 to 489.5 billion short tons at the beginning of 1983. 15 figures, 68 tables. (ERA citation 10:001838)

515,660
DE85002557/GAR PC **A02/MF A01**
Oak Ridge National Lab., TN.
Artificial Photosynthesis with Algal and Reconstituted Systems.
E. Greenbaum, M. E. Reeves, and J. Woodward.
1984, 22p CONF-840389-7
Contract AC05-84OR21400
US-Japan information exchange seminar on photochemical energy solar conversion, Okazaki, Japan, 12 Mar 1984.
Portions are illegible in microfiche products.

A general review of artificial or hydrogenic photosynthesis for the direct production of molecular oxygen and hydrogen is presented. A summary of the Oak Ridge National Laboratory's experimental research program on photosynthetic water splitting using algae is included. The rates of hydrogen and oxygen production in continuous-wave light must be improved significantly before practical developments can proceed. More fundamental research in the chemistry and physics of the process is recommended. 42 references, 5 figures. (ERA citation 10:002028)

515,661
DE85002660/GAR PC **A05/MF A01**
Battelle Pacific Northwest Labs., Richland, WA.
Opportunities for Energy Conservation Through Biotechnology.
J. K. Young, E. A. Griffin, and J. A. Russell. Nov 84, 98p PNL-5295
Contract AC06-76RL01830

The purpose of this study is to identify and quantify potential energy savings available through the development and application of biotechnologies. This information is required in support of ECUT research planning efforts as an aid in identifying promising areas needing further consideration and development. It is also intended as background information for a companion ECUT study being conducted by the National Academy of Science to evaluate the use of bioprocessing methods to conserve energy. Several studies have been conducted recently to assess the status and implications of the development of biotechnology. The Office of Technology Assessment (OTA) considered institutional, economic, and scientific problems and barriers. The National Science Foundation sponsored a study to examine regulatory needs for this new and expanding technology. Somewhat in contrast to these studies, this report covers principally the technical issues. It should be emphasized that the practicality of many developments in biotechnology is not evaluated solely on the basis of energy considerations. Bioprocesses must often compete with well-established coal, petroleum, and natural gas technologies. A complete evaluation of the technical, economical, and ecological impacts of the large-scale applications discussed in this report is not possible within the scope of this study. Instead, this report assesses the potential of biotechnology to save energy so that research into all aspects of implementation will be stimulated for those industries with significant energy savings potential. 92 references, 6 figures, 24 tables. (ERA citation 10:002552)

515,662
DE85002666/GAR PC **A04/MF A01**
RAND Corp., Santa Monica, CA.
Market Behavior under Partial Price Controls: The Case of the Retail Gasoline Market.
F. Camm. Mar 83, 56p RAND/R-2613-DOE/RC
Contract AC01-79PE70078

The use of firm-specific controls on the price of gasoline during 1979 and 1980, at both the wholesale and the retail level, dramatically affected the retail market for gasoline. The most visible effect was a diversity of monetary prices across service stations within particular retail market areas. Price could no longer play its usual role in clearing the retail market for gasoline. Queues and other changes in quality of service at stations arose to maintain the balance of market demand and supply. This report examines the behavior of an otherwise competitive market in the presence of such regulation-induced nonprice phenomena. In such a market, consumers consider both monetary prices and costs imposed by queues in deciding where to buy gasoline and how much to buy. Using a price-theoretic model of behavior, this paper predicts how various changes in effective price regulation affect consumers. 14 references, 7 figures, 2 tables. (ERA citation 10:001873)

515,663
DE85002698/GAR PC **A02/MF A01**
Colorado School of Mines, Golden. Dept. of Chemical and Petroleum Refining Engineering.
In-Situ Hydrate Thermal Measurements Project Status.
10 Nov 84, 7p DOE/MC/20693-T11
Contract AC21-83MC20693
Portions are illegible in microfiche products.

One objective of this project is to measure the heat capacity and heat of dissociation of samples of in-situ natural gas hydrates. These calorimetric measurements will be made using a Perkin-Elmer model DSC-2 differential scanning calorimeter. A second objective is to measure and model hydrate dissociation rates. These experimental measurements will be made with a Cahn 2000 recording electrobalance. Work on the project is proceeding on schedule. Over the last month we have concentrated on the following: (1) extending the mathematical modelling to hydrates in porous media; (2) determining the heat flux incident on the electrobalance samples; and (3) designing an apparatus to form methane hydrates in the laboratory. 1 reference, 2 figures. (ERA citation 10:001909)

515,664
DE85002760/GAR PC **A03/MF A01**
Illinois Inst. of Tech., Chicago.
Demulsification Tests with Merkl Fluids. Final Report, January-September 1982.
D. T. Wasan. Nov 82, 27p DOE/BC/10660-1
Contract AS19-82BC10660

The objective of this research was to quantitatively measure the ability of Merkl oil recovery fluid to break water in oil emulsions and to compare its ability with those of commercial demulsifiers. Our plan was to: (1) determine the coalescence behavior of water in crude oil emulsions for seven demulsifier systems; (2) determine the effect of temperature on coalescence behavior with water in crude oil emulsions over the temperature range of 35 to 60 exp 0 C; (3) measure interfacial tension and interfacial shear viscosity and to correlate these with the coalescence data; (4) determine the displacement ability of systems containing caustic or caustic mixtures with Merco fluid or sodium silicate. (ERA citation 10:001849)

515,665
DE85002800/GAR PC **A02/MF A01**
Stanford Univ., CA. Dept. of Chemical Engineering.
Toward New Coal Hydroprocessing and Liquefaction Catalysts. Progress Report, August 1983-December 1983.
M. Boudart. 1983, 19p DOE/PC/60782-T2
Contract FG22-83PC60782

One objective of this research project was to characterize the active phase of Mo-hydroprocessing catalysts in situ during operation (reaction temperature >500 exp 0 K, pressures in the range 6 to 14 MPa). For this purpose a stainless steel reaction cell was developed and extensively tested. Since the experiments require the use of flammable gases and liquids as well as a highly toxic gas (H sub 2 S) and are carried out at the Stanford Synchrotron Radiation Laboratory, a facility not equipped to deal with hazardous experiments, special attention had to be paid to safety aspects of the operation. Details of the cell design and its operation are described in the attached publication, which has been entered individually into EDB and ERA. (ERA citation 10:001718)

515,666
DE85003056/GAR PC **A03/MF A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Chemistry and Morphology of Coal Liquefaction. Annual Report, October 1, 1983-September 30, 1984.
H. Heinemann. Oct 84, 42p LBL-18456
Contract AC03-76SF00098

Work is reported as follows: (1) effect of various factors on the product distribution and kinetics of Fischer-Tropsch synthesis over iron catalysts in a fixed bed reactor; (2) the kinetics and selectivity of hydrocarbon synthesis with unpromoted bulk iron-based catalysts in a well-stirred slurry reactor free of temperature and concentration gradients; (3) low temperature reactions between graphite and water catalyzed by KOH; and (4) the catalytic hydrogenation of structural models of coal. (ERA citation 10:001737)

515,667
DE85003188/GAR PC **A04/MF A01**
Arizona Univ., Tucson. Dept. of Chemical Engineering.
Aerosol Formation from Pulverized Coal Combustion. Quarterly Reports 1, 2 and 3.
T. W. Peterson. 1 May 84, 57p DOE/PC/60602-T1
Contract FG22-83PC60802
Portions are illegible in microfiche products.

Three types of pulverized coal were burned in a laboratory furnace under various combustion configurations. Pulverized samples of Utah bituminous, Beulah (North Dakota) lignite and Texas lignite coals were burned at a rate of 2.5 kg/h in a laboratory furnace. Aerosol size distributions were measured at various positions within the convection section, and temperature and gas compositions were measured throughout. The evolution of the submicron particle size distribution within the convection section for the three coals was similar, although the location of the initial particle mode at the convection section inlet varied with coal type. While staged combustion of Utah bituminous coal had a variable effect on the volume of submicron aerosol produced, staged combustion of the lignites caused a definite increase in the submicron aerosol volume. Vapor enhancement due to a localized reducing atmosphere, which would effect coals of higher ash volatility, is thought to explain this behavior. 39 references, 13 figures, 6 tables. (ERA citation 10:001828)

515,668
N85-13066/4/GAR PC **A03/MF A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Liquid Phase Products and Solid Deposit Formation from Thermally Stressed Model Jet Fuels.
W. S. Kim, and D. A. Bittker. Nov 84, 30p NAS 1.15:86874, E-2334, NASA-TM-86874

The relationship between solid deposit formation and liquid degradation product concentration was studied for the high temperature (400 C) stressing of three hydrocarbon model fuels. A Jet Fuel Thermal Oxidation Tester was used to simulate actual engine fuel system conditions. The effects of fuel type, dissolved oxygen concentration, and hot surface contact time (reaction time) were studied. Effects of reaction time and removal of dissolved oxygen on deposit formation were found to be different for n-dodecane and for 2-ethylnaphthalene. When ten percent tetralin is added to n-dodecane to give a simpler model of an actual jet fuel, the tetralin inhibits both the deposit formation and the degradation of n-dodecane. For 2-ethylnaphthalene primary product analyses indicate a possible self-inhibition at long reaction times of the secondary reactions which form the deposit precursors. The mechanism of the primary breakdown of these fuels is suggested and the primary products which participate in these precursor-forming reactions are identified. Some implications of the results to the thermal degradation of real jet fuels are given.

515,669
N85-13073/0/GAR PC **A02/MF A01**
Foersvarets Forskningsanstalt, Umea (Sweden).
Method for Evaluating Petrol Products Corrosivity Using Piezoelectric Crystals. Part 2: Instruction Manual.
B. Hedman, and R. Roffey. May 84, 24p FOA-C-40198-B4
In Swedish; English Summary. Sponsored by Swedish National Board of Economic Defence and Swedish Defence Material Administration.

A method based on the use of piezoelectric crystals covered with silver was developed for measuring the corrosivity of stored jet fuel. Sample handling the use of instruments and crystals analysis procedures and the different problems that may appear are described.

515,670
PB85-137800/GAR PC **A13/MF A01**
Nor'West-Pacific Corp., Bellevue, WA.
Direct Combustion Systems to Produce Power from Biomass from Wood, Forest and Agricultural Crop Residue,
D. W. Pingrey, and N. E. Waggoner. May 81, 294p AID-PN-AAL-768
Contract USDA/FS-53-319R-0-135, Grant PASA-AG(STR)-4709-6-79

As an aid to energy planners in the developing world, this report provides a comprehensive state of the art summary of direct combustion systems for utilizing biomass residues. 'Off-the-shelf' conventional direct combustion systems are identified, their applications are discussed, and constraints to their use in developing countries are evaluated. Attention is given both to the systems' economic viability and their potential environmental impacts. Principles of biomass combustion are explained, and tables of biomass fuel analyses and sample combustion calculations are given. Handling and processing of biomass materials, including drying to aid combustion, are discussed. The advantages and disadvantages of biomass-fueled electric power plants are analyzed as are the costs associated with a typical 16 megawatt electric biomass-fueled plant producing 50% cogenerated steam. The appendix lists names and addresses of vendors of combustion systems and equipment needed to handle biomass materials. A 10-page bibliography is included.

515,671
PB85-140176/GAR PC **A06/MF A01**
Battelle Columbus Labs., OH.
Ethanol from Sugar Crops: A Critical Review,
E. S. Lipinsky, B. R. Allen, A. Bose, and S. Kresovich. Jan 81, 109p AID-PN-AAK-844
Contract USDA/FS-53-319R-0-233, Grant PASA-AG(STR)-4709-6-79

Due to the hardships resulting from rising oil prices and periodic production shortfalls, many developing countries, especially those with warm humid climates, have explored ethanol production from sugar crops. This critical review offers information on ethanol production for development planners. Two sugar crop-based ethanol systems, raw sugar facility retrofit and conventional juice extraction, are first examined. The agronomy of sugar crops (cane, beet, sorghum) is then described, as are the steps in crop processing (extraction, fermentation, distillation, stillage disposal). The costs of producing ethanol from a typical sugarcane processing plant and from a state-of-the-art molasses processing facility are presented, and the trade-offs between producing ethanol or raw sugar from sugarcane weighed. Finally, the properties of ethanol in automotive fuels are outlined, along with important storage, handling, and safety considerations. Three major problems are cited in ethanol production from sugar crops: adverse environmental effects (10 gallons of waste to 1 gallon of ethanol); the high cost of conventional milling equipment; and the loss of potential revenue from raw sugar sales. A future possibility of producing ethanol from fibrous residues (bagasse) is noted. Included are a 64-item bibliography (1936-1980) and 31 tables.

515,672
PB85-154722/GAR PC **A07/MF A01**
Southern Illinois Univ. at Carbondale. Dept. of Geology.
Petrographic and Fluorescence Spectral Properties of Liptinite and Vitrinite Coal Macerals.
Final rept. Jan 82-May 84,
J. C. Crelling. Jun 84, 146p GRI-84/0121
Contract GRI-5082-260-0618
See also PB84-167121.

The purpose of this study is to gain a better understanding of the properties of various coal macerals. Because it is both expensive and very difficult to separate the various macerals from coal, the macerals were studied in situ by quantitative fluorescence microscopy. This method has only recently been applied to the study of coal and has already lead to the discovery of new macerals, and a better understanding of coal rank and the coalification process. The results of this study showed that many fluorescent macerals are undercounted in normal white-light analysis and that additional structures and textures are often visible in fluorescence analysis. Fluorescence spectral analysis of various samples of the Herrin (No. 6) and Springfield-Harrisburg (No. 5) seam from Illinois and the Hartshorne seam from Oklahoma can quantitatively distinguish various maceral types and two or more varieties of each type. For example, in all of the seams examined, two varieties of the maceral, fluorinite, were characterized. To avoid nomenclature problems caused by the abundance of new maceral varieties, the concept of spectral type was developed. In samples of different rank from each of the three seams the fluorescence properties of fluorinite, sporinite, and cutinite show a systematic change with an increase in coal rank. In addition, secondary macerals were also identified - semifusinite and vitrinite. These macerals were specific to the host maceral and also showed a change in spectral properties with rank.

515,673
PB85-155984/GAR PC **A03/MF A01**
Pennsylvania State Univ., University Park. Dept. of Materials Science and Engineering.
Importance of Active Sites for Char Gasification in Oxygen (Air) and Carbon Dioxide.
Annual rept. Oct 83-Sep 84,
R. G. Jenkins, and A. Piotrowski. Dec 84, 41p GRI-84/0234
Contract GRI-5014-363-0235
See also PB84-148105.

Nonisothermal gasification reactivities in air (5 K/min) and the isothermal reactivities in carbon dioxide (973 and 1073 K) of a Montana lignite and chars, prepared by slow and rapid pyrolysis of the raw and suitably pretreated lignite, have been measured by thermogravimetric analysis. The coal pretreatment involved demineralization, ion exchange with ammonium acetate, and subsequent ion exchange with calcium acetate. Reac-

tivity data show the marked influence of the presence of calcium species on reactivity in both air and carbon dioxide. However, there appears to be a saturation effect. That is, after a certain quantity of calcium ion is added (about 0.49 mmole/g) further addition does not have an appreciable influence on the measured gasification reactivity. In an attempt to measure the concentration of carbon active sites, oxygen chemisorption capacities of several prepared chars were determined at 375 K and 0.1 MPa air. It is noted that the 'active area' does reflect the order of reactivity in both air and carbon dioxide. Highly reactive chars chemisorb large quantities of oxygen at the conditions used, indicating high activity.

515,674

PB85-156958/GAR PC **A09/MF A01**
Institute of Gas Technology, Chicago, IL.
Biogasification of Walt Disney World Biomass Waste Blend.
Annual rept. Jan-Dec 83,
R. Biljetina, D. P. Chynoweth, J. Janulis, and V. J. Srivastava. Sep 84, 181p R-30556, GRI-84/0191
Contract GRI-5082-223-0567
See also PB83-242636.

The objective of this research is to develop efficient processes for conversion of biomass-waste blends to methane and other resources. To evaluate the technical and economic feasibility, an experimental test unit (ETU) was designed and installed at the Reedy Creek Wastewater Treatment Plant at Walt Disney World in Lake Buena Vista, Florida. The facility integrates a biomethanogenic conversion process with a wastewater treatment process employing water hyacinth ponds for secondary and tertiary treatment of sewage. Harvested water hyacinth is subsequently combined with sludge from the primary wastewater clarifier and fed at 1-wet-ton per day to the ETU digester. This results in the production of methane and other useful byproducts. Design, procurement of equipment and installation has been completed. Start-up of the ETU is in progress.

515,675

PB85-156966/GAR PC **A08/MF A01**
Institute of Gas Technology, Chicago, IL.
Biological Gasification of Renewable Resources.
Annual rept. Jan 83-Feb 84,
D. P. Chynoweth, K. F. Fannin, D. E. Jerger, V. J. Srivastava, and J. R. Conrad. Nov 84, 174p R-30571, GRI-84/0192
Contract GRI-5083-226-0773

The objective of this project was to determine the best reactor configuration and optimum operating conditions for anaerobic digestion of each of four prototype feeds--water hyacinth/sludge, kelp, sorghum, and poplar--representing feedstocks of varying particulate and lignin content. A kinetic analysis of two different reactor types recovering a blend of water hyacinth and sludge indicated better performance of a non-mixed upflow solids reactor (USR) to that of a continuously stirred tank reactor (CSTR). The results of preliminary lab analyses and systems calculations suggest that substantial improvement in performance is possible by digestion of low-solids juice in an ambient temperature reactor and hyacinth solids in a different reactor. A kinetic analysis of kelp digestion also indicated superior performance of the USR over the CSTR digester. Conversion yields and rates and process stability were shown to be greater in a kelp lot with higher mannitol content. The biodegradability of sorghum was as high as 87% theoretical. The USR exhibited superior performance to that of the CSTR on this feedstock. Particle size reduction did not effect rates on yields in the range of 0.06 to 0.3 inches. Ensiling resulted in rapid production of fermentation products, including carbon dioxide, hydrogen, and volatile acids. High conversion and associated methane yields was observed during digestion of diluted poplar. Both methane yield as production rates were adversely affected at increasing solids concentrations. Preliminary results suggest that a two-phase leachate bed recycle system may be most effective for biogasification of wood.

515,676

PB85-159457/GAR PC **A03/MF A01**
Institute of Gas Technology, Chicago, IL.
Anaerobic Digestion of Biomass: Status Summary and Research and Development Needs, 1983 (Condensed Version).
Topical rept. for Jan-Oct 83,
D. P. Chynoweth, K. F. Fannin, D. E. Jerger, V. J. Srivastava, and R. Biljetina. Jul 84, 30p GRI-84/0133.2
Contract GRI-5081-323-0463
See also PB85-161925.

This condensed report reviews the status of anaerobic digestion from the perspective of producing methane from biomass. Research needs are discussed and listed with prioritization. The report is divided into three sections. The first section, Microbial Ecology, reviews hydrolytic, intermediate, and methanogenic bacteria. The second section, Feed Characteristics, reviews feed composition, pre-/posttreatment, nutrient requirements, and toxicity. The third section, Process Design, Operation, Evaluation, and Control, reviews reactor designs, process start-up, operation, stability and control, kinetics and modeling, net energy, and process scale-up and commercialization.

515,677

PB85-854826/GAR PC **N01/MF N01**
National Technical Information Service, Springfield, VA.
Zeolites in Catalysis. June 1983-February 1985 (Citations from the Energy Data Base).
Rept. for Jun 83-Feb 85.
Feb 85, 227p
Supersedes PB84-860212. Prepared in cooperation with Department of Energy, Washington, DC.

This bibliography contains citations concerning the catalytic effects of zeolites and zeolite-containing catalysts in the catalytic cracking, reforming, and refining of hydrocarbons from fossil fuels; that is, petroleum, coal liquids, etc. Also considered are the uses of hydrocarbons from methanol, in desulfurization processes, and in the reduction of nitrogen oxides. (This updated bibliography contains 235 citations, 173 of which are new entries to the previous edition.)

515,678

PB85-854974/GAR PC **N01/MF N01**
National Technical Information Service, Springfield, VA.
Coal Tar Technology. 1970-February 1985 (Citations from the NTIS Data Base).
Rept. for 1970-Feb 85.
Feb 85, 220p
Supersedes PB84-860691.

This bibliography contains citations concerning various aspects of coal tar. Topics include production from coal gasification, synthesis of chemicals from coal tar, and chemical analyses of coal tar products. Toxicology, pollution studies, and commercial uses of the product are also discussed. (This updated bibliography contains 223 citations, 33 of which are new entries to the previous edition.)

515,679

PB85-914600/GAR Subscription
Department of Energy, Oak Ridge, TN. Technical Information Div.
Fossil Energy Update.
Monthly repts.
1985, 13 issues
Supersedes PB84-914600.
Paper copy available on subscription, North American Continent price $75.00/year; all others write for quote. Issued 13 times annually including a cumulative index. Single copies also available.

Fossil Energy Update (FEU) provides abstracting and indexing coverage of current scientific and technical reports, journal articles, conference papers and proceedings, books, patents, theses, and monographs from all sources on fossil energy. The subject matter covered by FEU includes coal, petroleum, natural gas, oil shale, hydrogen production, hydrocarbon and alcohol fuels, electric power engineering, and magnetohydrodynamic generators.

21E. Jet and Gas Turbine Engines

515,680

AD-A149 028/3/GAR PC **A13/MF A01**
Advisory Group for Aerospace Research and Development, Neuilly-sur-Seine (France).
Conference Proceedings of Engine Cyclic Durability by Analysis and Testing.
G. E. Breitkopf, T. M. Speer, T. M. Edmunds, R. A. Lawrence, and W. R. Taylor. 1984, 277p Rept no. AGARD-CP-368
Theme in French.

The Conference Proceedings contains 19 papers presented at the Propulsion and Energetics 63rd (B) Specialists' Meeting on Engine Cyclic Durability by Analysis and Testing, which was held in Lisse, Netherlands, on 30 May-1 June 1984. The Technical Evaluation Report is included at the beginning of the Proceedings. Questions and answers of the discussions follow each paper. The Specialists' Meeting was arranged in four sessions: Engine Utilization and Accelerated Missions Testing Development (3); Critical Material Characterization (4); Life Assessment Methodologies (4); and Component and Engine Cyclic Testing (8). The Specialists' Meeting surveyed the current state-of-the-art in technological areas related to improving engine life. It considered the technical and economical problems of advanced cyclic testing in the development of engines. Discussed were: relationships between engine utilization and failure modes, accelerated mission testing development, critical material characteristics, component life assessment methods, recent results of component and engine cyclic testing, and future requirements.

515,681

DE84752109/GAR PC **A07/MF A01**
Motoren- und Turbinen-Union G.m.b.H., Munich (Germany, F.R.).
Increase of Efficiency in Cooled High Temperature Turbines. Phase I.
H. J. Dietrichs, H. W. Happel, and K. Heinig. May 84, 128p BMFT-FB-W-84-019
In German.
U.S. Sales Only. Portions are illegible in microfiche products.

Within the scope of the BMFT-Programme "Increase of efficiency in cooled high temperature turbines" MTU carried out an extensive experimental and theoretical study in order to improve the accuracy and cost effectiveness in the aerodynamic design of highly loaded HP-turbines. The study included the following subjects: - aerodynamic and heat transfer test in cold air rigs and demonstrator engines, - inverse design of aerofoils, - further development of a turbine noise calculation method, - basic studies for the development of a inviscid 3D-code. This report gives a summary of the results that were achieved during the phase I (1981-82) of this programm. (ERA citation 09:050069)

515,682

DE85000215/GAR PC **A02/MF A01**
Massachusetts Inst. of Tech., Cambridge.
Study of Deposition Control Using Transpiration. Technical Progress Report, September 1984.
J. F. Louis, and H. Kozlu. 1984, 14p DOE/MC/20334-T11
Contract AC21-83MC20334

The purpose of this project is to determine the conditions under which transpiration may be actually used to avoid the deposition of small particles. The application of this work is the control of the deposition of small particles over a surface at a temperature below the melting point of compounds likely to exist in the combustion products. A combined experimental and theoretical research program will be carried out to evaluate the concept of transpiration as a deposition control strategy. A first order theory will be refined by introducing an appropriate model. The experimental program is designed to evaluate and refine the theoretical model under conditions which provide the correct Reynolds and Stokes numbers. The experimental set up consists of a wind tunnel with a test section containing a flat porous transpired section. The measurements will determine the distribution of velocity and of particle concentration in the boundary layer. The experiments will be conducted for different particles sizes under conditions simulating gas turbine conditions. (ERA citation 10:002951)

515,683

N85-12690/8/GAR PC **A09/MF A01**
Dayton Univ., OH.

Turbine Blade Damping Study.
Final Report.
R. J. Dominic. Nov 84, 200p NAS 1.26:171255, UDR-TR-84-87, NASA-CR-171255
Contract NAS8-34682

No abstract available.

515,684
N85-12894/9/GAR PC **A06/MF A01**
Jet Propulsion Lab., Pasadena, CA.
Experimental Investigation of Two-Dimensional Thrust Augmenting Ejectors, Part 1.
Final Report.
L. Bernal, and V. Sarohia. 15 Aug 84, 104p NAS 1.26:174111, JPL-PUB-84-50-PT-1, NASA-CR-174111
Sponsored by NASA, AFFDL, AFOSR, and Nadc.

Experiments have been performed with subsonic and underexpanded choked two-dimensional primary nozzle ejector flow systems without diffusion to evaluate the role of entrainment and mixing in thrust augmentation. Two-component Laser Doppler velocity measurements (mean and fluctuating values), thrust measurements, ejector shroud surface pressure measurements and flow visualization were used to determine the evolution of the velocity profiles and their relationship to the ejector performance. The key findings of this research are: (1) Primary jet growth is significantly altered by the ejecter shroud, (2) primary jet turbulent characteristics when normalized with the local mean centerline velocity are in agreement with those for the free-jet, (3) in the neighborhood of the ejector shroud the flow field can be classified into two regions, the potential flow region and the region close to the ejector exist which is dominated by the turbulent transport, and (4) The pressure recovery is very sharp in the first region and is more gradual in the region close to the ejector exit.

515,685
N85-12895/7/GAR PC **A05/MF A01**
Jet Propulsion Lab., Pasadena, CA.
Experimental Investigation of Two-Dimensional Thrust Augmenting Ejectors, Part 2.
Final Report, Jan. 1982 - Dec. 1983.
L. Bernal, and V. Sarohia. 15 Aug 84, 96p NAS 1.26:174110, JPL-PUB-84-50-PT-2, NASA-CR-174110
Contract NAS7-918
Sponsored in Part by AFFDL, AFOSR, and Nadc.

The flow-field within a two-dimensional thrust augmenting ejector has been documented experimentally. Results are presented on the mean velocity field and the turbulent correlations by Laser Doppler Velocimeter, surface pressure distribution, surface temperature distribution, and thrust performance for two shroud geometries. The maximum primary nozzle pressure ratio tested was 3.0. The tests were conducted at primary nozzle temperature ratios of 1.0, 1.8 and 2.7. Two ejector characteristic lengths have been identified based on the dynamics of the ejector flow field, i.e., a minimum length L sub m below which no significant mixing occurs, and a critical length L sub c associated with the development of U'V' correlation in the ejector. These characteristic lengths divide the ejector flow field into three distinctive regions: the entrance region where there is no direct interaction between the primary flow and the ejector shroud; the interaction region where there is an increased momentum of induced flow near the shroud surface; and a pipe flow region characterized by an increased skin friction where x is the distance downstream from the ejector inlet. The effect of the coflowing induced flow has been shown to produce inside the ejector a centerline velocity that has increased over the free-jet data.

515,686
N85-12899/9/GAR PC **A04/MF A01**
Elektroschmelzwerk Kempten G.m.b.H., Munich (Germany, F.R.).
Development and Fabrication of Refractory Bodies for Gas Turbine Engines.
Final Report, Apr. 1983.
K. Hunold, W. Greiner, A. Lipp, and K. Reinmuth.
Sep 84, 75p BMFT-FB-T-84-180
In German; English Summary. Sponsored by Bundesministerium fuer Forschung und Technologie.

Applying hot isostatic pressing (HIP) techniques, dense bodies were manufactured from SiC and SiC/Si3 N4 mixtures with and without sintering aids. The correlation between strength and microstructure of hot-pressed silicon carbide (HPSiC) with different aluminum additions was investigated. The material properties of HIPSIC and standard-SiC were compared. The conditions of diffusion bonding of SiC parts were elaborated.

515,687
N85-13549/9/GAR PC **A09/MF A01**
General Electric Co., Cincinnati, OH.
Experimental Investigation of Shock-Cell Noise Reduction for Dual-Stream Nozzles in Simulated Flight.
Final Report.
B. A. Janardan, K. Yamamoto, R. K. Majjigi, and J. F. Brausch. Nov 84, 189p NAS 1.26:3846, E-2283, NASA-CR-3846
Contract NAS3-23166

Six scale-model nozzles were tested in an anechoic facility to evaluate the effectiveness of convergent-divergent (C-D) terminations in reducing shock-cell noise of unsuppressed and mechanically suppressed coannular plug nozzles. One hundred fifty-three acoustic test points with inverted velocity profiles were conducted under static and simulated flight conditions. Diagnostic flow visualization with a shadowgraph and velocity measurements with a laser velocimeter were performed on selected plumes. Shock-cells were identified on the plug and downstream of the plug of the unsuppressed convergent coannular nozzle with truncated plug. Broadband peak frequencies predicted with the two shock-cell structures were correlated with the observed spectra using the measured shock-cell spacings. Relative to a convergent circular nozzle, the perceived noise level (PNL) data at an observer angle of 60 deg relative to inlet, indicated a reduction of (1) 6.5 dB and 9.2 dB with unsuppressed C-D coannular nozzle with truncated plug and (2) 7.7 dB and 8.3 dB with suppressed C-D coannular nozzle under static and simulated flight conditions, espectively. The unsuppressed C-D coannular nozzle with truncated plug, operating at the C-D design condition, had shock-cells downstream of the plug with no shock-cells on the plug. The downstream shock-cells were eliminated by replacing the truncated plug with a smooth extension to obtain an additional 2.4 dB and 3 dB front quadrant PNL reduction, under static and simulated flight conditions, respectively. Other results are discussed.

515,688
N85-13550/7/GAR PC **A17/MF A01**
General Electric Co., Cincinnati, OH.
Experimental Investigation of Shock-Cell Noise Reduction for Single Stream Nozzles in Simulated Flight.
Final Report.
K. Yamamoto, J. F. Brausch, T. F. Balsa, B. A. Janardan, and P. R. Knott. Dec 84, 397p NAS 1.26:3845, E-2282, NASA-CR-3845
Contract NAS3-22514

Seven single stream model nozzles were tested in the Anechoic Free-Jet Acoustic Test Facility to evaluate the effectiveness of convergent divergent (C-D) flowpaths in the reduction of shock-cell noise under both static and mulated flight conditions. The test nozzles included a baseline convergent circular nozzle, a C-D circular nozzle, a convergent annular plug nozzle, a C-D annular plug nozzle, a convergent multi-element suppressor plug nozzle, and a C-D multi-element suppressor plug nozzle. Diagnostic flow visualization with a shadowgraph and aerodynamic plume measurements with a laser velocimeter were performed with the test nozzles. A theory of shock-cell noise for annular plug nozzles with shock-cells in the vicinity of the plug was developed. The benefit of these C-D nozzles was observed over a broad range of pressure ratiosin the vicinity of their design conditions. At the C-D design condition, the C-D annual nozzle was found to be free of shock-cells on the plug.

515,689
N85-13551/5/GAR PC **A03/MF A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Static Jet Noise Test Results of Four 0.35 Scale-Model QCGAT(Quiet Clean General Aviation Turbofan) Mixer Nozzles.
D. E. Groesbeck, and C. A. Wasserbauer. Oct 84, 47p NAS 1.15:86871, E-2333, NASA-TM-86871

As part of the NASA Quiet Clean General Aviation Turbofan (QCGAT) engine mixer-nozzle exhaust system program, static jet exhaust noise was recorded at microphone angles of 45 to 155 deg relative to the nozzle inlet for a conventional profile coaxial nozzle and three 12-lobed coaxial mixer nozzles. Both flows in all four nozzles are internally mixed before being discharged from a single exhaust nozzle. The conventional profile coaxial nozzle jet noise is compared to the current NASA Lewis coaxial jet noise prediction and after applying an adjustment to the predicted levels based on the ratio of the kinetic energy of the primary and secondary flows, the prediction is within a standard deviation of 0.9 dB of the measured data. The mass average (mixed flow) prediction is also compared to the noise data for the three mixer nozzles with a reasonably good fit after applying another kinetic energy ratio adjustment (standard deviation of 0.7 to 1.5 dB with the measured data). The tests included conditions for the full-scale engine at takeoff (T.O.), cutback (86% T.O.) and approach (67% T.O.).

515,690
PB85-143212/GAR PC **E03/MF E01**
Eidgenoessisches Flugzeugwerk, Emmen (Switzerland).
Extrapolation of Engine Inlet Measurements According to Tsukahira,
H. Affolter. 16 Mar 78, 21p FWE/SIG/FO-1350-E

Messrs. G.R. Hall and T.W. Tsukahira, engineers at Northrop Corporation, have developed a simple extrapolation method which enables engine inlet characteristics to be measured at low speeds and converted to higher subsonic speeds. This method is based on the assumption that inlet pressure loss, distortion and turbulence are directly dependent on the dynamic pressure of the undisturbed flow, provided the inlet mass flow ratio is invariant.

21G. Reciprocating Engines

515,691
DE85000994/GAR PC **A07/MF A01**
Booz-Allen and Hamilton, Inc., Bethesda, MD. Transportation Consulting Div.
Methanol Engine Conversion Feasibility Study: Phase 1.
Mar 83, 127p DOE/CS/50271-T1
Contract AI01-81CS50271
Portions are illegible in microfiche products.

This report documents the selection of the surface-assisted ignition technique to convert two-stroke Diesel-cycle engines to methanol fuel. This study was the first phase of the Florida Department of Transportation methanol bus engine development project. It determined both the feasibility and technical approach for converting Diesel-cycle engines to methanol fuel. State-of-the-art conversion options, associated fuel formulations, and anticipated performance were identified. Economic considerations and technical limitations were examined. The surface-assisted conversion was determined to be feasible and was recommended for hardware development. (ERA citation 10:002582)

515,692
N85-13007/8/GAR PC **A02/MF A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Stirling Material Technology.
R. H. Titran, J. R. Stephens, and C. M. Scheuermann. 1984, 22p NAS 1.15:86888, DOE/NASA/51040-57, NASA-TM-86888
Contract DE-AI01-77CS-51040
Presented at the 22ND Automotive Technol. Develop. Contractors' Conf. Coord. Meeting, Dearborn, Mich., 29 Oct. - 2 Nov. 1984; Sponsored by the Society of Automotive Engineers.

The Stirling engine is an external combustion engine that offers the advantage of high fuel economy, low emissions, low noise, and low vibrations compared to current internal combustion automotive engines. The most critical component from a materials viewpoint is the heater head consisting of the cylinders, heating tubes, and regenerator housing. Materials requirements for the heater head include compatibility with hydrogen, resistance to hydrogen permeation, high temperature oxidation/corrosion resistance, and high temperature creep-rupture and fatigue properties. A materials research and technology program identified the wrought alloys CG-27 and 12RN72 and the cast alloys XF-818, NASAUT 4G-A1, and NASACC-1 as

candidate replacements for the cobalt containing alloys used in current prototype engines. It is concluded that manufacture of the engine is feasible from low cost iron-base alloys rather than the cobalt alloys used in prototype engines. Results of research that lead to this conclusion are presented.

515,693
N85-13235/5/GAR PC **A16/MF A01**
Cummins Engine Co., Inc., Columbus, IN.
Advanced Automotive Diesel Assessment Program.
Final Report.
R. Sekar, and L. Tozzi. Dec 83, 354p NAS 1.26:168285, DOE/NASA/0261-1, NASA-CR-168285
Contract DEN3-261

No abstract available.

515,694
N85-13557/2/GAR PC **A04/MF A01**
Centre Technique des Industries Mecaniques, Senlis (France).
Bruit des Petits Groupes Moto-Compresseurs Mobiles. Experimentation de Plusieurs Traitements Acoustiques de Cout Limite et Permettant des Gains Progressifs (Noise in Small Portable Motocompressors. Experiments on Limited-Cost Acoustic Treatments to Obtain Progressive Improvements).
Final Report.
J. Collober, and B. Corlay. Apr 84, 56p CETIM-11-H-445
Text in French.

Design modifications are proposed in order to help motocompressor manufacturers to reduce the noise level to 85 dBA. Work on 8kW groups shows that the noise sources are, in order of importance, the internal combustion motor exhaust, the air inlet, the cooling air circuit and the oil pan. The effects of an inlet air filter, an exhaust noise attenuator and a cover on the motocompressor are discussed. A noise reduction of 10dBA is obtained.

21H. Rocket Motors and Engines

515,695
AD-P004 340/6/GAR PC **A02/MF A01**
Naval Weapons Center, China Lake, CA.
Report on AGARD Meeting Hazards Studies for Solid Propellant Rocket Motors,
R. L. Derr, and J. F. Kincaid. Jun 84, 6p
This article is from 'JANNAF Propulsion Systems Hazards Subcommittee Meeting (1984) Held at Army Ballistic Research Laboratory, Aberdeen Proving Ground, Maryland on 18-20 June 1984. Volume 1,' AD-A148 865, P9-14.
Availability: Chemical Propulsion Information Agency, Johns Hopkins Road, Laurel, MD 20707 (No copies furnished by DTIC/NTIS).

In this meeting, technical interactions between AGARD and NATO standardization activities provided the basis for improved hazard methodologies to be used in the design of future solid propellant rocket motors. In addition, a basis was provided for new research and development topics to be addressed by the different NATO countries interested in the development, production, and sale of high energy solid rocket motors. The objectives of the meeting were achieved; however, it was agreed that all aspects of this subject could not be covered because of time limitations. (Author)

515,696
N85-12859/3/GAR PC **A02/MF A01**
CHAM of North America, Inc., Huntsville, AL.
Analysis of Physical-Chemical Processes Governing SSME Internal Fluid Flows.
Progress Report, May - Jun. 1984.
A. K. Singhal, S. F. Owens, T. Mukerjee, L. W. Keeton, and L. T. Tam. 1984, 12p NAS 1.26:171247, CHAM-4045/1, NASA-CR-171247
Contract NAS8-35970

In order to aid the development of current and future SSME type engines, it is necessary to improve the understanding of basic issues related with physical-chemical processes of SSME internal flows. Accomplishments under each of the following specific objectives are described herein: (1) supplying a state-of-the-art CFD code and graphics package; (2) demonstrating code usage on SSME-related problems to NASA MSFC personnel; and (3) performance computations and analysis of problems relevant to current and future SSME's.

21I. Rocket Propellants

515,697
AD-A148 865/9 Not available NTIS
Johns Hopkins Univ., Laurel, MD. Chemical Propulsion Information Agency.
JANNAF(Joint-Army-Navy-NASA-Air Force) Propulsion Systems Hazards Subcommittee Meeting (1984) Held at Army Ballistic Research Laboratory, Aberdeen Proving Ground, Maryland on 18-20 June 1984. Volume 1.
Rept. for 16 Jul 83-20 Jun 84,
D. S. Eggleston. Jun 84, 145p Rept no. CPIA-PUB-409-VOL-1
Contract N00024-83-C-5301
For sales information of individual items see AD-P004 339 - AD-P004 350. See also Volume 2, AD-CO35 816L.
Availability: Chemical Propulsion Information Agency, Johns Hopkins Road, Laurel, MD 20707 (No copies furnished by DTIC).

This volume is the first of two volumes of the proceedings of the 1984 Joint Army-Navy-NASA-Air Force (JANNAF) Propulsion Systems Hazards Subcommittee Meeting, held 18-20 June 1984 at the Army Ballistic Research Laboratory, Aberdeen Proving Ground, Maryland. It contains twelve unclassified/unlimited-distribution papers on tactical and strategic missile hazards, including risk analysis of prematurely armed warheads, NATO and AGARD hazard programs, recovery of damaged propellants, DDT initiation mechanisms, and safety aspects of prepackaged liquid propellants for strategic missiles. (Author)

515,698
AD-P004 343/0/GAR PC **A02/MF A01**
Pennsylvania State Univ., University Park. Dept. of Mechanical Engineering.
Recovery of Damaged Solid Propellants by Interrupting Burning and Crack-Propagaton Processes,
J. Mantzaras, E. Andiroglu, and K. K. Kuo. Jun 84, 14p
This article is from 'JANNAF Propulsion Systems Hazards Subcommittee Meeting (1984) Held at Army Ballistic Research Laboratory, Aberdeen Proving Ground, Maryland on 18-20 June 1984. Volume 1,' AD-A148 865, P37-50.
Availability: Chemical Propulsion Information Agency, Johns Hopkins Road, Laurel, MD 20707 (No copies furnished by DTIC/NTIS).

Crack propagation in burning solid propellants and explosives can affect the performance of a rocket motor by increasing both the burning surface area and local pressurization rates. This may sometimes lead to deflagration-to-detonation transition (DDT) or detonation due to some unresolved mechanisms (XDT). In order to obtain direct evidence of structural damage of the propellant sample during crack propagation and branching, an interrupted burning experiment has been designed, constructed, and tested. Sample recovered from a preliminary test firing showed rough surface structure and several macrocracks in directions from the initial crack orientation. The propellant sample is believed to undergo significant cracking and branching before the extinction. This is supported by the experimental evidence of rough and cracked surfaces of the recovered sample, source-flow pattern observed from high-speed movie films, and extremely rapid pressurization of the source-flow region beyond the initial crack tip due to the fast burning of damaged propellant sample. (Author)

515,699
AD-P004 344/8/GAR PC **A02/MF A01**
New Mexico Univ., Albuquerque. Dept. of Mechanical Engineering.
Antiplane Cracks in Solid Propellants,
F. D. Ju, and J. J. Jacoby. Jun 84, 9p
This article is from 'JANNAF Propulsion Systems Hazards Subcommittee Meeting (1984) Held at Army Ballistic Research Laboratory, Aberdeen Proving Ground, Maryland on 18-20 June 1984. Volume 1,' AD-A148 865, P51-59.
Availability: Chemical Propulsion Information Agency, Johns Hopkins Road, Laurel, MD 20707 (No copies furnished by DTIC/NTIS).

This work investigates a mechanism for solid propellant hazard. That mechanism is a consequence of friction from a running antiplane crack propagating in its own plane. When a continuum that contains a crack is subjected to an applied load at some oblique angle to the face of the crack, then the load may be resolved into a shear stress and a normal stress. The normal stress causes friction at the crack surface that resists further growth of the crack while the shear stress provides the driving force for crack growth. It follows that for given crack characteristics and given load, the kinematics of the crack depend on the crack orientation with respect to the load. Continuous displacement in the antiplane direction will occur provided the shear stress is sufficient to cause the crack to grow. Under the conditions of continuous crack growth the friction energy will depend upon the normal pressure. There may exist combinations of applied load and crack orientations, that will lead to a deflagration to detonation transition of the propellant. Of fundamental importance is a stability criterion for a single crack, which is the subject of this paper. By making a number of simplifying assumptions it is possible to derive this stability criterion analytically. This result will subsequently be used to verify computer simulations before investigating more realistic material properties. (Author)

515,700
AD-P004 345/5/GAR PC **A02/MF A01**
Illinois Univ. at Urbana-Champaign.
Transition to Detonation from Rapid-Compression (Ramp-Waves) Generated in a Burning Porous Bed,
C. A. Cudak, H. Krier, and P. B. Butler. Jun 84, 9p
This article is from 'JANNAF Propulsion Systems Hazards Subcommittee Meeting (1984) Held at Army Ballistic Research Laboratory, Aberdeen Proving Ground, Maryland on 18-20 June 1984. Volume 1,' AD-A148 865, P61-69.
Availability: Chemical Propulsion Information Agency, Johns Hopkins Road, Laurel, MD 20707 (No copies furnished by DTIC/NTIS).

Increasing the nitramine content of solid rocket propellants increases the overall performance of the system as well as the sensitivity to detonation by shock initiation. In some instances a confined zone of granulated propellant adjacent to a zone of cast propellant can provide a rapid enough pressure-rise rate to shock initiate the cast material. If the cast propellant is porous, the detonation will initiate at some location ahead of the granulated bed/cast material interface. The work presented here is an effort to numerically model this Deflagration to Shock to Detonation Transition (DSDT) event. Results will be presented showing the detonation build up for propellant beds with various initial configurations and boundary conditions. (Author)

515,701
AD-P004 349/7/GAR PC **A02/MF A01**
Lawrence Livermore National Lab., CA.
Measurement of Shock Induced Reaction in Rocket Propellants by Nanosecond Infrared Radiometry and Photography,
W. G. von Holle, J. Kury, E. James, and K. Scribner. Jun 84, 9p
This article is from 'JANNAF Propulsion Systems Hazards Subcommittee Meeting (1984) Held at Army Ballistic Research Laboratory, Aberdeen Proving Ground, Maryland on 18-20 June 1984. Volume 1,' AD-A148 865, P117-125.
Availability: Chemical Propulsion Information Agency, Johns Hopkins Road, Laurel, MD 20707 (No copies furnished by DTIC/NTIS).

This report examines shocked energetic materials with upgraded radiometers capable of 5 ns (5 x .000000005 sec) resolution. Shock-induced heating and reaction are now much better resolved, allowing much better characterization of distinct material shock responses. Initially various explosives and pressed inert powders were examined. Although this work is incomplete, enough has been done to make meaningful correlations and general conclusions about he mechanism of shock initiation. Several prototype propellants have thus far been examined. Tentative results based on the same analysis techniques used for the other mate-

rials indicate a completely different shock response. After a brief summary of the results and conclusions for explosives and pressed inerts, the latest results from the shocked prototype propellants will be presented, followed by some tentative conclusions based on a comparison with past propellant and the current explosives data.

515,702
AD-P004 350/5/GAR PC **A02/MF A01**
Rockwell International, Canoga Park, CA. Rocketdyne Div.
Safety Aspects of Prepackaged Liquid Propellant Stages for Strategic Missiles.
C. J. Meisl, and L. P. Combs. Jun 84, 12p
This article is from 'JANNAF Propulsion Systems Hazards Subcommittee Meeting (1984) Held at Army Ballistic Research Laboratory, Aberdeen Proving Ground, Maryland on 18-20 June 1984. Volume 1,' AD-A148 865, P127-136.
Availability: Chemical Propulsion Information Agency, Johns Hopkins Road, Laurel, MD 20707 (No copies furnished by DTIC/NTIS).

This paper reviews the salient safety-relevant design and operational aspects of past and current small, prepackaged, storable liquid propellant missile stages such as Bullpup, Lance, Minuteman II Propulsion System Rocket Engine, and Peacekeeper Stage IV. The outstanding service record and safety experience during extensive ground transportation of full loaded stages, during many hours of storage and silo exposure, and in operational launches, are discussed in quantitative terms. Design and operational features responsible for this proven safety record are examined. These include propellant and pressurant isolation, tank and pressure vessel safety factors, ordnance features, external protection of propellant, stage size effects, and testing approach. Conclusions from the historical data are drawn as they apply to the design and operational approach of liquid propellant stages or velocity control systems for future strategic or tactical missiles. (Author)

22.
SPACE TECHNOLOGY

22A. Astronautics

515,703
N85-12907/0/GAR PC **A06/MF A01**
Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt e.V., Cologne (Germany, F.R.).
Colloquium About Joint Projects within DFVLR/ISRO(Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt/Indian Space Research Organization, Bangalore, Satellite Centre) Cooperation.
Jun 84, 102p DFVLR-MITT-84-12
Colloq. Held at Bangalore, 24 Jan. 1984.

No abstract available.

515,704
N85-12915/3/GAR PC **A03/MF A01**
Centre National d'Etudes Spatiales, Toulouse (France).
Mars Dust Sample Return Mission.
O. Grosjean. 12 Jul 84, 41p CNES-CT/PMF/APS/EMS-177
In French; English Summary.

Strategies to collect dust from Mars atmosphere are discussed. The mission concept is based on the fact that in the vicinity of the martian perihelion, great dust storms obstruct the atmosphere completely, throwing particles up to 60 km altitude. In the first approach the probe can gather dust from an elliptical orbit around Mars, and it stays in orbit for 2 years waiting for the storms and for the return-window opportunity toward Earth. In the second approach the dust catcher is a fly-by spacecraft, which skims the upper martian atmosphere with high navigation accuracy. The first option has definite advantages in spite of the larger propulsion required.

515,705
N85-12916/1/GAR PC **A06/MF A01**
Centre National d'Etudes Spatiales, Toulouse (France).
Mission Interstellaire (Interstellar Mission).
M. Boyer. 25 Jun 84, 113p
Text in French.

The technology required for an unmanned spacecraft to reach the nearest star in less than a century is examined. The average mission velocity must be at least 0.043c, implying a specific impulse of at least 100,000s. The only types of propulsion which can provide that capacity are fission, fusion and antimatter. An improvement of at least 100 times on present performances must be assured. The telecommunication problem is comparatively less important. A CO2 laser in the band of 9 to 12 microns can assure communication with Earth. No navigation problems are expected.

515,706
N85-12921/1/GAR PC **A10/MF A01**
Martin Marietta Corp., Bethesda, MD.
Selected Tether Applications in Space: An Analysis of Five Selected Concepts.
Final Report.
31 Jul 84, 206p NAS 1.26:171222, NASA-CR-171222
Contract NAS8-35499

Ground rules and assumptions; operations; orbit considerations/dynamics; tether system design and dynamics; functional requirements; hardware concepts; and safety factors are examined for five scenarios: tethered effected separation of an Earth bound shuttle from the space station; tether effected orbit boost of a spacecraft (AXAF) into its operational orbit from the shuttle; an operational science/technology platform tether deployed from space station; a tether mediated rendezvous involving an OMV tether deployed from space station to rendezvous with an aerobraked OTV returning to geosynchronous orbit from a payload delivery mission; and an electrodynamic tether used in a dual motor/generator mode to serve as the primary energy storage facility for space station.

515,707
N85-12922/9/GAR PC **A05/MF A01**
Martin Marietta Aerospace, Denver, CO. Denver Div.
Definition of Technology Development Missions for Early Space Station Satellite Servicing. Volume 1. Executive Summary.
Final Report.
Nov 84, 93p NAS 1.26:171228, SSS-FR-04-01-V-1, NASA-CR-171228

The Executive Summary volume 1, includes an overview of both phases of the Definition of Technology Development Missions for Early Space Station Satellite Servicing. The primary purpose of Phase 1 of the Marshall Space Flight Center (MSFC) Satellite Servicing Phase 1 study was to establish requirements for demonstrating the capability of performing satellite servicing activities on a permanently manned Space Station in the early 1990s. The scope of Phase 1 included TDM definition, outlining of servicing objectives, derivation of initial Space Station servicing support requirements, and generation of the associated programmatic schedules and cost. The purpose of phase 2 of the satellite servicing study was to expand and refine the overall understanding of how best to use the manned space station as a test bed for demonstration of satellite servicing capabilities.

515,708
N85-12923/7/GAR PC **A08/MF A01**
Martin Marietta Aerospace, Denver, CO. Denver Div.
Definition of Technology Development Missions for Early Space Station Satellite Servicing. Volume 2. Technical.
Final Report.
D. A. Cable, C. A. Diewald, T. C. Hills, T. J. Parmentier, and R. A. Spencer. Nov 84, 170p NAS 1.26:171229, SSS-FR-04-01-V-2, NASA-CR-171229
Contract NAS8-35042

Volume 2 contains the Technical Report of the approach and results of the Phase 2 study. The phase 2 servicing study was initiated in June 1983, and is being reported in this document. The scope of the contract was to: (1) define in detail five selected technology development missions (TDM); (2) conduct a design requirement analysis to refine definitions of satellite servicing requirements at the space station; and (3) develop a technology plan that would identify and schedule prerequisite precursor technology development, associated. STS flight experiments and space station experiments needed to provide onorbit validation of the evolving technology.

515,709
N85-13473/2/GAR PC **A03/MF A01**
McDonnell Douglas Astronautics Co.-West, Huntington Beach, CA.
Human Role in Space. Volume 1. Executive Summary.
Final Report.
Oct 84, 27p NAS 1.26:171223, MDC-H1295-V-1, NASA-CR-171223
Contract NAS8-35611

The role and degree of direct involvement of humans required in future space missions were investigated. Criteria for allocating functional activities between humans and machines were established. The technology requirements, economics, and benefits of the human presence in space were investigated.

515,710
N85-13474/0/GAR PC **A14/MF A01**
McDonnell Douglas Astronautics Co.-West, Huntington Beach, CA.
Human Role in Space. Volume 2. Research Analysis and Technology Report.
Final Report.
Oct 84, 320p NAS 1.26:171224, MDC-H1295-V-2, NASA-CR-171224
Contract NAS8-35611

The human role in space was studied. The role and the degree of direct involvement of humans that will be required in future space missions are investigated. Valid criteria for allocating functional activities between humans and machines were established. The technology requirements, economics, and benefits of the human presence in space was examined. Topics discussed include: human qualifications for space activities; specific project assessments; technology requirements and tasks; and generalization on human roles in space.

515,711
N85-13475/7/GAR PC **A04/MF A01**
McDonnell Douglas Astronautics Co.-West, Huntington Beach, CA.
Human Role in Space. Volume 3: Generalizations on Human Roles in Space.
Final Report, Oct. 1983 - Sep. 1984.
Oct 84, 66p NAS 1.26:171225, MDC-H1295-V-3, NASA-CR-171225
Contract NAS8-35611

The human role in space was studied. The role and the degree of direct involvement of humans that will be required in future space missions, was investigated. Valid criteria for allocating functional activities between humans and machines were established. The technology requirements, ecnomics, and benefits of the human presence in space were examined. Factors which affect crew productivity include: internal architecture; crew support; crew activities; LVA systems; IVA/EVA interfaces; and remote systems management. The accomplished work is reported and the data and analyses from which the study results are derived are included. The results provide information and guidelines to enable NASA program managers and decision makers to establish, early in the design process, the most cost effective design approach for future space programs, through the optimal application of unique human skills and capabilities in space.

22B. Spacecraft

515,712
N85-12867/6/GAR PC **A04/MF A01**
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.

Space Shuttle Orbiter Trimmed Center-of-Gravity Extension Study. Volume 8: Effects of Configuration Modifications on the Aerodynamic Characteristics of the 140 a/B Orbiter at a Mach Number of 5.97.
W. P. Phillips. Nov 84, 73p NAS 1.15:72661-V-8, NASA-TM-72661-V-8

Aerodynamic characteristics at M=5.97 for the 140 A/B Space Shuttle Orbiter configuration and for the configuration modified by geometric changes in the wing planform fillet region and the fuselage forebody are presented. The modifications, designed to extend the orbiter's longitudinal trim capability to more forward center of gravity locations, include reshaping the baseline wing fillet, changing the fuselage forebody camber, and adding canards. The Langley 20 inch Mach 6 Tunnel at a Reynolds number of approximately 6 million based on fuselage reference length was used. The angle of attack range of the investigation varied from about 15 deg to 35 deg at 0 deg and -5 deg sideslip angles. Data are obtained with the elevators and body flap deflected at appropriate negative and positive conditions to assess the trim limits.

515,713
N85-12906/2/GAR PC **A05**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Technologies for Space Station Autonomy.
R. L. Staehle. 15 Jun 84, 80p NAS 1.26:174112, JPL-PUB-84-45, NASA-CR-174112
Contract NAS7-918

This report presents an informal survey of experts in the field of spacecraft automation, with recommendations for which technologies should be given the greatest development attention for implementation on the initial 1990's NASA Space Station. The recommendations implemented an autonomy philosophy that was developed by the Concept Development Group's Autonomy Working Group during 1983. They were based on assessments of the technologies' likely maturity by 1987, and of their impact on recurring costs, non-recurring costs, and productivity. The three technology areas recommended for programmatic emphasis were: (1) artificial intelligence expert (knowledge based) systems and processors; (2) fault tolerant computing; and (3) high order (procedure oriented) computer languages. This report also describes other elements required for Station autonomy, including technologies for later implementation, system evolvability, and management attitudes and goals. The cost impact of various technologies is treated qualitatively, and some cases in which both the recurring and nonrecurring costs might be reduced while the crew productivity is increased, are also considered. Strong programmatic emphasis on life cycle cost and productivity is recommended.

515,714
N85-12920/3/GAR PC **A04**/MF **A01**
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
Oil-Flow Study of a Space Shuttle Orbiter Tip-Fin Controller.
V. T. Helms. Dec 83, 56p NAS 1.15:86276, L-15750, NASA-TM-86276

Possible use of tip-fin controllers instead of a vertical tail on advanced winged entry vehicles was examined. Elimination of the vertical tail and using tip-fins offers the advantages of positive yaw control at high angles of attack and a potential weight savings. Oil-flow technique was used to obtain surface flow patterns on a tip-fin installed on a 0.01-scale Space Shuttle orbiter model for the purpose of assessing the extent of flow interference effects on the wing and tip-fin which might lead to serious heating problems. Tests were conducted in air at Mach 10 for a free-stream Reynolds numbers of .000113 at 20, 30, and 40 degree angle of attack and sideslip angles of 0 and 2 degree. Elevon deflections of -10, 0, and 10 degree and tip-fin control-surface deflections of 0, 20, and 40 degree were employed. Test results were also used to aid in the interpretation of heating data obtained on a Shuttle orbiter tip-fin on another model in a different facility. A limited comparison of oil-flow patterns and heat-transfer data is included. It was determined that elevon deflection angles from -10 to 10 degree and sideslip angles up to 2 degree have very little effect on tip-fin surface flow patterns. Also, there is a minimum of interference between the tip-fin and the wing. The most significant flow interactions occur on the tip-fin onboard surface as a result of its control-surface deflections.

515,715
N85-12926/0/GAR PC **A02**/MF **A01**
Allgemeine Elektricitaets-Gesellschaft AEG Telefunken, Wedel (Germany, F.R.).
Space Know-How, Twenty Years' Space Experience.
1984, 17p
Original Contains Color Illustrations.

Photographs of solar array construction and power conditioning systems, and drawings of various satellites are presented. Space activities of AEG-Telefunken are summarized.

515,716
N85-12931/0/GAR PC **A04**/MF **A01**
Allied Bendix Aerospace, Teterboro, NJ. Guidance Systems Div.
Autonomous Momentum Management for Space Station.
Final Report, 1 Oct. 1983 - 31 Aug. 1984.
E. Hahn. 15 Oct 84, 70p NAS 1.26:174065, NASA-CR-174065
Contract NAS8-35349

Momentum management for the CDG planar space platform is discussed. It is assumed that the external torques on the space station are gravity gradient and aerodynamic, both have bias and cyclic terms. The integrals of the cyclic torques are the cyclic momenti which will be stored in the momentum storage actuator. Techniques to counteract the bias torques and center the cyclic momentum and gravity gradient desaturation by adjusting vehicle attitude, aerodynamic desaturation using solar panels and radiators and the deployment of flat plates at the end of long booms generating aerodynamic torques are investigated.

515,717
N85-12932/8/GAR PC **A03**/MF **A01**
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
Conceptual Design for Scaled Truss Antenna Flight Experiment.
W. H. Lee. Nov 84, 40p NAS 1.15:85804, L-15838, NASA-TM-85804

The conceptual design for a scaled truss antenna structures experiment program (STASEP) is presented. The hardware analysis of the scaled truss antenna structure (STAS) was performed by interactive design and evaluation of advanced spacecraft (IDEAS) computer aided, interactive, design and analysis program. Four STAS's were designed to be launched by the Shuttle, tested by using the space technology experiments platform (STEP) and space transportation system (STS), and then free flown in short lifetime orbits. Data were gathered on deployment, structural characteristics, geometric accuracies, thermal performance, and drag and lifetime as an orbiting spacecraft. Structural and thermal properties were determined for the STAS, including mass properties, thermal loading, structural natural frequencies, and mode shapes. The necessary analysis, scaling, and ground testing are discussed.

515,718
N85-12933/6/GAR PC **A04**/MF **A01**
Bendix Corp., Teterboro, NJ.
Autonomous Momentum Management for Space Station, Exhibit A.
Final Report, 1 Oct. 1983 - 31 Aug. 1984.
E. Hahn. 15 Oct 84, 70p NAS 1.26:171256, NASA-CR-171256
Contract NAS8-35349

The report discusses momentum management for the CDG Planar Space Platform. The external torques on the Space Station are assumed to be gravity gradient and aerodynamic with both having bias and cyclic terms. The integrals of the cyclic torques are the cyclic momenti which will be stored in the momentum storage actuator. Various techniques to counteract the bias torques and center the cyclic momentum were investigated including gravity gradient desaturation by adjusting vehicle attitude, aerodynamic desaturation using solar panels and radiators and the deployment of flat plates at the end of long booms generating aerodynamic torques.

515,719
N85-12936/9/GAR PC **A05**/MF **A01**
TRW Defense and Space Systems Group, Redondo Beach, CA.
Space Power Distribution System Technology. Volume 3. Test Facility Design.
Final Report.
D. K. Decker, M. D. Cannady, J. E. Cassinelli, B. F. Farber, and C. Lurie. Mar 83, 89p NAS 1.26:171230, TRW-34579-6001-UT-00-V-3, NASA-CR-171230
Contract NAS8-33198

The AMPS test facility is a major tool in the attainment of more economical space power. The ultimate goals of the test facility, its primary functional requirements and conceptual design, and the major equipment it contains are discussed.

515,720
N85-13259/5/GAR PC **A02**/MF **A01**
European Space Research and Technology Centre, Noordwijk (Netherlands).
ESA(European Space Agency) Product Assurance Specification System: Explanatory Note.
6 Jul 84, 15p

The ESA product assurance specifications were rewritten and reidentified to fit into a three-level structure. The ESA PSS-01-0 contains the basic requirements for product assurance and is the only document in the top level, i.e., level 1. Level 2 comprises 9 disciplines, each of which expands into detailed requirements one of the major disciplines covered more generally in PSS-01-0. The remainder of the specifications are in level 3 and are intended as supporting specifications which cover methods, special processes, data, etc. They can be direct extensions of requirements in the level 2 specifications.

22D. Spacecraft Launch Vehicles and Ground Support

515,721
N85-12917/9/GAR PC **A04**/MF **A01**
Centre National d'Etudes Spatiales, Toulouse (France).
Les Systemes de Lancements (Launching Systems).
M. Gilli. Feb 84, 60p CNES-NT-111
Text in French.

Launch vehicles operational in 1984 are reviewed. Launch system development in Brazil, China, India, Japan, the USA, the U.S.S.R., and Europe is described. Commercial aspects, including Ariane and space shuttle price policies are discussed.

515,722
N85-12924/5/GAR PC **A06**/MF **A01**
National Aeronautics and Space Administration, Greenbelt, MD. Goddard Space Flight Center.
Launch Summary for 1978 - 1982.
H. K. Hills. Jan 84, 106p NAS 1.15:87375, NSSDC/WDC-A-R/S-84-01, NASA-TM-87375

Data pertinent to the launching of space probes, soundings rockets, and satellites presented in tables include launch date, time, and site; agency rocket identification; sponsoring country or countries; instruments carried for experiments; the peak altitude achieved by the rockets; and the apoapsis and periapsis for satellites. The experimenter or institution involved in the launching is also cited.

KEYWORD INDEX

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Comparison of Structural Computer Programs Used for the Analysis of Spent Fuel Shipping Casks.
DE85002444/GAR *515,385*

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Air Abrasive Equipment for the Measurement of Residual Stresses in the Bores of Pipes and Tubes,
PB85-143170/GAR *515,180*

ABSORPTION COOLING
Mathematical Models for the Boiling Diagram of the Ideal Two-Component Mixture.
N85-13000/3/GAR *514,701*

ABSORPTION REFRIGERATION CYCLE
Water-Lithium Bromide Double-Effect Absorption Cooling Analysis. Final Report.
DE85002757/GAR *515,072*

ABSORPTION SPECTRA
Ice-Soil Mixtures: Visual and Near-Infrared Remote Sensing Techniques.
N85-13358/5/GAR *514,775*

ABSORPTIVITY
Ice-Soil Mixtures: Visual and Near-Infrared Remote Sensing Techniques.
N85-13358/5/GAR *514,775*

ABSTRACTS
Air Force Office of Scientific Research (AFOSR) Technical Report Summaries. Third Quarter (CY).
AD-A148 965/7/GAR *514,441*

ACCELERATION
Acceleration Measurements in High G Environments.
AD-A148 896/4/GAR *515,506*

ACCEPTANCE TESTS
NATO AC/310 Activities Report on NATO STANAG 4170 and Allied Ordnance Publication 7, AOP-7 (Manual of Tests for Qualification of Explosive Materials for Military Use).
AD-P004 341/4/GAR *515,494*

ACCIDENT INVESTIGATIONS
Marine Accident Report - Capsizing and Sinking of the United States Drillship GLOMAR JAVA SEA in the South China Sea, 65 Nautical Miles South-Southwest of Hainan Island, People's Republic of China, October 25, 1983.
PB84-916408/GAR *515,181*

Pipeline Accident Report - Boston Gas Company, Natural Gas Overpressure, Explosion and Fires, East Boston, Massachusetts, September 23, 1983.
PB84-916505/GAR *515,182*

Railroad/Highway Accident Report - Collision of Amtrak Passenger Train No. 301 on Illinois Central Gulf Railroad with Marquette Motor Service Terminals, Inc. Delivery Truck, Wilmington, Illinois, July 28, 1983.
PB84-917006/GAR *515,183*

Railroad Accident Reports.
PB85-916300/GAR *515,188*

Transportation Special Reports.
PB85-917000/GAR *515,189*

ACCIDENTS
Risk Analysis of Crane Accidents, Gulf of Mexico OCS Region.
PB85-142743/GAR *515,187*

ACCOUNTING
Waste Accountability, Shipping, and Packaging (WASP) Handbook.
DE85001535/GAR *515,381*

ACCREDITATION
Acoustical Laboratory Accreditation Program of the United States.
PB85-151694 *515,517*

ACETYLCHOLINE
Conference on Dynamics of Cholinergic Function: Acetylcholine in Health, Disease and Aging Held at Oglebay Park, West Virginia on 31 October-4 November 1983.
AD-A148 914/5/GAR *514,646*

Anticholinesterase Effects on Number and Function of Brain Muscarinic Receptors and Central Cholinergic Activity: Drug Intervention.
AD-A148 973/1/GAR *514,640*

ACID RAIN
Studies of the Mechanisms and Rates with Which Nitrogen Species are Incorporated into Cloud Water and Precipitation.
PB85-144350/GAR *514,419*

ACIDITY
Observational Study of Transport in the Free Troposphere,
PB85-144145/GAR *515,104*

ACOUSTIC BEAMS
Surface Projections of Array Beam Patterns.
AD-A148 999/6/GAR *515,278*

ACOUSTIC EMISSIONS
Acoustic Emission Transducer Calibration by Means of the Seismic Surface Pulse.
AD-A148 921/0/GAR *515,513*

ACOUSTIC EXCITATION
Response Measurements for Two Building Structures Excited by Noise from a Large Horizontal Axis Wind Turbine Generator.
N85-13552/3/GAR *515,191*

ACOUSTIC MEASUREMENT
Acoustical Laboratory Accreditation Program of the United States.
PB85-151694 *515,517*

ACOUSTIC RETROFITTING
Bruit des Petits Groupes Moto-Compresseurs Mobiles. Experimentation de Plusieurs Traitements Acoustiques de Cout Limite et Permettant des Gains Progressifs (Noise in Small Portable Motocompressors. Experiments on Limited-Cost Acoustic Treatments to Obtain Progressive Improvements).
N85-13557/2/GAR *515,694*

ACOUSTIC SCATTERING
An Oceanic Reverberation Model.
AD-A149 000/2/GAR *515,515*

ACOUSTIC SIGNALS
Knowledge based Programming Applications,
AD-A148 913/7/GAR *514,806*

ACPR REACTOR
Fuel Disruption Mechanisms Determined In-Pile in the ACRR (Annular Core Research Reactor).
NUREG/CR-3780/GAR *515,482*

ACQUIRED IMMUNODEFICIENCY SYNDROME
Reports on AIDS (Acquired Immunodeficiency Syndrome) Published in the Morbidity and Mortality Weekly Report, June 1981 through January 1985.
PB85-162139/GAR *514,599*

ACQUISITION COSTS
DOD (Department of Defense) Manufacturing Technology Program--Management is Improving but Benefits Hard to Measure.
PB85-144186/GAR *515,264*

KEYWORD INDEX

ACTINIDE SERIES
Field Experiment Determinations of Distribution Coefficients of Actinide Elements in Sulfate Lake Environments.
NUREG/CR-4094/GAR *515,341*

ACTIVATED CARBON
Reaction of Oxygen-Nitrogen Mixtures with Granular Activated Carbons below the Spontaneous Ignition Temperature.
AD-A149 041/6/GAR *514,689*

Plasticity, Agglomeration and Volatiles Secondary Reactions in Coal Pyrolysis. Annual Report, September 10, 1983-February 29, 1984.
DE85002492/GAR *515,655*

ACTIVATED CARBON TREATMENT
Feasibility Study of Alternative Technology for Small Community Water Supply.
PB85-143287/GAR *515,102*

ACTUATOR DISKS
Turbine Blade Damping Study.
N85-12890/8/GAR *515,683*

ACTUATORS
Autonomous Momentum Management for Space Station, Exhibit A.
N85-12933/6/GAR *515,718*

ACUTE CARE
Readjustment of Older Persons After Acute Hospitalization.
PB85-147494/GAR *514,597*

ADA PROGRAMMING LANGUAGE
Ada (Trademark) Primer.
AD-A148 855/0/GAR *514,801*

ADAPTATION
Adaptation de Parois a Mach 1.2 (Wall Adaptation at Mach 1.2).
N85-12873/4/GAR *515,213*

ADAPTATION (PHYSIOLOGY)
Effect of Extreme Peripheral Light on Dark Adaptation.
AD-A148 923/8/GAR *514,647*

ADAPTIVE CONTROL
Evaluation of Automated Decisionmaking Methodologies and Development of an Integrated Robotic System Simulation.
N85-13516/8/GAR *514,828*

ADAPTIVE CONTROL SYSTEMS
Simplified Grasping and Manipulation with Dextrous Robot Hands.
AD-A148 962/4/GAR *515,163*

Research in Adaptive and Decentralized Control.
AD-A148 964/0/GAR *515,020*

ADAPTIVE FILTERS
Noise Removal in Multichannel Images.
N85-13526/7/GAR *514,829*

ADDITIVES
Effect of Lubricant Extreme-Pressure Additives on Surface Fatigue Life of AISI 9310 Spur Gears.
N85-13234/8/GAR *515,166*

ADDRESS REGISTERS
Register of Products Manufactured in South Africa, 1979 (Updated to 1982) (Register van Produkte in Suid-Afrika Vervaardig, 1979 (Bygewerk tot 1982)).
PB85-139442/GAR *514,452*

ADENOSINE PHOSPHATES
Use of ATP-MgCl2 in the Treatment of Injury and Shock.
AD-A149 031/7/GAR *514,641*

ADHESIVE BONDING
Reliability of Adhesive Bonds Under Severe Environments. Report of the Committee on Reliability of Adhesive Bonds in Severe Environments.
AD-A149 010/1/GAR *515,125*

ADHESIVES
Biocompatible Cementitious Dental Compositions.
PATENT-4 486 179 *514,956*

ADOLESCENTS
Adolescent Pregnancy and Childbearing: Findings from Research.
SHR-0011823/GAR *514,563*

ADSORBENTS
Engineered Sorbent Barriers for Low-Level Waste.
DE85000833/GAR *515,397*

ADSORPTION
Orientation of Hydroquinone and Benzoquinone Adsorbed on Platinum Electrodes: Studies by Reflection-Adsorption Infrared Spectroscopy.
AD-A149 011/9/GAR *514,688*

Optical Second Harmonic Generation for Surface Studies.
DE85000670/GAR *515,519*

ADVECTION
Equations and Algorithms for Meteorological Applications in Air Weather Service.
AD-A148 894/9/GAR *514,410*

Generalized Formulation of TVD (Total Variation Diminution) Lax-Wendroff Schemes.
N85-13528/3/GAR *515,040*

AERIAL SURVEYS
Cumulus Cloud Venting of Mixed Layer Ozone,
PB85-144137/GAR *514,408*

AERODYNAMIC CHARACTERISTICS
Study of Flow Past an Airfoil with a Jet Issuing from Its Lower Surface.
N85-12860/1/GAR *514,316*

Application of the Onera Model of Dynamic Stall.
N85-12862/7/GAR *514,318*

Space Shuttle Orbiter Trimmed Center-of-Gravity Extension Study. Volume 8: Effects of Configuration Modifications on the Aerodynamic Characteristics of the 140 a/B Orbiter at a Mach Number of 5.97.
N85-12867/6/GAR *515,712*

AERODYNAMIC CONFIGURATIONS
Vergleichende Stroemungsrechnung an Transonischen Kegel/Zylinder-Eidhmodellen im Zusammenhang MIT Dem Wandinterferenzproblem (Comparative Flow Calculation on Transonic Cone/Cylinder Standard Models in Connection with the Wall Interference Problem).
N85-12878/3/GAR *515,218*

Preliminary Checkout, Evaluation and Calibration of a 3-Component Force Measurement System for Calibrating Propulsion Simulators for Wind Tunnel Models.
N85-12903/9/GAR *515,220*

AERODYNAMIC DRAG
Hypothetical Zero Yaw Drag Trajectory of Spinning Projectiles between M = 5 and M = 10.
AD-A148 899/8/GAR *515,492*

Comparison of Wortmann Airfoil Computer-Generated Lift and Drag Polars with Flight and Wind Tunnel Results.
N85-12868/4/GAR *514,321*

AERODYNAMIC STABILITY
Oil-Flow Study of a Space Shuttle Orbiter Tip-Fin Controller.
N85-12920/3/GAR *515,714*

Flutter Parametric Studies of Cantilevered Twin-Engine Transport Type Wing with and Without Winglet. Volume 2: Transonic and Density Effect Investigations.
N85-13270/2/GAR *514,340*

AERODYNAMIC STALLING
Application of the Onera Model of Dynamic Stall.
N85-12862/7/GAR *514,318*

AERODYNAMICS
Aeronautical Engineering, a Continuing Bibliography with Indexes.
N85-12858/5/GAR *514,315*

Development of Computational Fluid Dynamics at NASA Ames Research Center.
N85-12866/8/GAR *514,320*

Autonomous Momentum Management for Space Station.
N85-12931/0/GAR *515,716*

Etudes Aerodynamiques Liees au Developpement des Divergents Deployables (Aerodynamic Studies of Deployment Devices).
PB85-140911/GAR *515,277*

Precision des Essais de 1/2 Maquettes Motorisees a S2MA (Half Powered Model Tests in the Modane Center).
PB85-141703/GAR *514,326*

AERONAUTICAL ENGINEERING
Aeronautical Engineering, a Continuing Bibliography with Indexes.
N85-12858/5/GAR *514,315*

AERONAUTICS
Natural Laminar Flow Airfoil Design Considerations for Winglets on Low-Speed Airplanes.
N85-12863/5/GAR *514,319*

AEROSOL WASTES
Prototype Firing Range Air Cleaning System.
DE85000360/GAR *515,176*

AEROSOLS
Cumulus Cloud Venting of Mixed Layer Ozone,
PB85-144137/GAR *514,408*

AEROSPACE ENVIRONMENTS
Les Transistors MOS de Puissance (Metal Oxide Semiconductors Power Transistors).
N85-13166/2/GAR *514,792*

AEROSPACE INDUSTRY
Space Know-How, Twenty Years' Space Experience.
N85-12926/0/GAR *515,715*

Les Composants Electronics pour Applications Spatiales (Electronic Components for Space Applications).
N85-13169/6/GAR *514,849*

Fiabilite Composants et Technologies d'Assemblage (Component Reliability and Assembling Technologies).
N85-13258/7/GAR *515,153*

Un Systeme de Documentation Electronique (An Electronic Documentation System).
N85-13683/6/GAR *514,449*

AEROSPACE MEDICINE
Aerospace Medicine and Biology, a Continuing Bibliography with Indexes.
N85-13467/4/GAR *514,585*

Space Medicine Research Publications: 1983-1984.
N85-13469/0/GAR *514,586*

AEROSPACE SYSTEMS
Conceptual Design for Scaled Truss Antenna Flight Experiment.
N85-12932/8/GAR *515,717*

AFRICA
Africa: A Strategic Factor in the Strategic Equation of the World.
AD-A148 983/0/GAR *514,496*

Qualitative Assessment of Selected Regional Training Institutions in West and Central Africa,
PB85-134716/GAR *514,535*

Private Sector: Regulation of Rural Markets in Africa.
PB85-140150/GAR *514,349*

AGENCY FOR INTERNATIONAL DEVELOPMENT
Dissent, Objectivity and Ethics in Program Evaluation,
PB85-144606/GAR *514,436*

AGGLOMERATION
20-Atmosphere Rig PFBC Results: Tests 18 and 19. Further Investigation into Agglomerate Formation when Using Limestone as the Sorbent.
DE84012001/GAR *515,061*

AGING (MATERIALS)
Influence de la Relaxation sur les Caracteristiques Mecaniques d'UN Composite Carbone Epoxy, Proces-Verbal No. 45.427/1 (Influence of Relaxation on the Mechanical Characteristics of a Carbon-Epoxy Composite. Report No. 45.427/1).
N85-12980/7/GAR *514,976*

AGRICULTURAL ECONOMICS
Federal Credit Programs for Agriculture: Background for 1985 Farm Legislation.
PB85-138923/GAR *514,348*

Consequences of Small Farm Mechanization on Rural Employment, Incomes and Production in Selected Countries of Asia: Report of a Joint ADC-IRRI (Agricultural Development Council-International Rice Research Institute) Workshop, 14-18 September 1981.
PB85-141646/GAR *514,364*

Landless Workers and Rice Farmers: Peasant Subclasses Under Agrarian Reform in Two Philippine Villages,
PB85-142644/GAR *514,351*

Agroindustries Investment and Trade Opportunities in Morocco,
PB85-143725/GAR *514,356*

Mauritania: Rural Assessment and Manpower Surveys. Oasis Agriculture.
PB85-144624/GAR *514,358*

Research on Agricultural Development in Sub-Saharan Africa: A Critical Survey.
PB85-145686/GAR *514,360*

U.S. Cropland, Urbanization, and Landownership Patterns.
PB85-146637/GAR *514,361*

AGRICULTURAL ENGINEERING
Consequences of Small Farm Mechanization on Rural Employment, Incomes and Production in Selected Countries of Asia: Report of a Joint ADC-IRRI (Agricultural Development Council-International Rice Research Institute) Workshop, 14-18 September 1981.
PB85-141646/GAR *514,364*

AGRICULTURAL MACHINERY
Technology Change in the Philippine Agricultural Machinery Industry,
PB85-141695/GAR *514,365*

Animal Traction: Guidelines for Utilization.
PB85-146058/GAR *514,369*

AGRICULTURAL SECTOR
Study of the Cooperative Movement in Honduras,
PB85-133635/GAR *514,346*

Private Sector: Regulation of Rural Markets in Africa.
PB85-140150/GAR *514,349*

Children and Women in Traditional and Cash Crop Agriculture: A Preliminary Cross-Section Study of Economic Development in Guatemala,
PB85-143709/GAR *514,355*

AGRICULTURAL TRADE DEVELOPMENT ACT OF 1954
Financial Leverage Potential of Local Currency Proceeds Generated from the Food for Peace Program to Stimulate Private Enterprise in Developing Countries,
PB85-143097/GAR *514,481*

AGRICULTURAL WASTES
Farm Scale Electrical Power Production from Animal Waste. Volume I. Final Report, 30 June 1981-30 December 1983.
DE85000309/GAR *514,362*

AGRICULTURE
Rural Financial Markets and Income Distribution in Low Income Countries, Excerpt from Savings and Development,
PB85-134740/GAR *514,347*

Agricultural Research System of Pakistan: The Report of the Minnesota Reconnaissance Team,
PB85-141836/GAR *514,372*

Report of an Exploratory Workshop on the Role of Anthropologists and other Social Scientists in Interdisciplinary Teams Developing Improved Food Production Technology.
PB85-142651/GAR *514,352*

Technology and Management Needs of Small and Medium Agro-Industrial Enterprises in Kenya: Implications for an International Agro-Industrial Service Center,
PB85-143071/GAR 514,354

Mauritania: Rural Assessment Manpower Surveys - Dryland Agriculture.
PB85-144228/GAR 514,357

Energy and Fertilizer: Policy Implications and Options for Developing Countries.
PB85-144301/GAR 514,367

AIR BREATHING ENGINES

Experimental Investigation of Two-Dimensional Thrust Augmenting Ejectors, Part 1.
N85-12894/0/GAR 515,684

Experimental Investigation of Two-Dimensional Thrust Augmenting Ejectors, Part 2.
N85-12895/7/GAR 515,685

AIR FORCE OPERATIONS

AirLand Battle Execution -- Some Implications of Deep Attack.
AD-A148 948/3/GAR 515,269

AIR POLLUTION

Effects of SO2 on a Grassland: A Case Study in the Northern Great Plains of the United States,
PB85-137354/GAR 514,371

Scientific Assessment Document on Status of Complex Terrain Dispersion Models for EPA Regulatory Applications,
PB85-138584/GAR 515,091

Maps Depicting Nonattainment Areas Pursuant to Section 107 of the Clean Air Act - 1984,
PB85-140630/GAR 515,097

Review and Evaluation of the Evidence for Cancer Associated with Air Pollution.
PB85-142016/GAR 514,670

Ambient Monitoring of Pollutants Around Synfuel Plants.
PB85-142701/GAR 515,100

Technical Assistance Document for Monitoring Sulfuric Acid Vapor from Stationary Sources,
PB85-143261/GAR 514,713

Proceedings: National Symposium on Recent Advances in Pollutant Monitoring of Ambient Air and Stationary Sources, Held at Radison Plaza Raleigh Hotel, on May 8-10, 1984.
PB85-144053/GAR 515,240

Cumulus Cloud Venting of Mixed Layer Ozone,
PB85-144137/GAR 514,408

Observational Study of Transport in the Free Troposphere,
PB85-144145/GAR 515,104

Theoretical Study of the Optical Properties of Diesel Particles.
PB85-144368/GAR 514,715

Air Sampling Devices. March 1976-January 1985 (Citations from the Energy Data Base).
PB85-854792/GAR 515,252

AIR POLLUTION CONTROL

Reducing Pollutant Emissions by Fines Removal.
PATENT-4 485 747 515,090

Environmental Aspects of Transportation,
PB85-145134/GAR 515,111

Kinetics of Nitric Oxide Formation in Laminar and Turbulent Methane Combustion.
PB85-149698/GAR 514,716

Flue Gas Desulfurization. 1970-February 1985 (Citations from the Engineering Index Data Base).
PB85-854925/GAR 515,115

AIR POLLUTION CONTROL EQUIPMENT

Design Report on the Atmospheric Fluidized Bed Combustor at the Kentucky Center for Energy Research Laboratory,
PB85-138915/GAR 515,092

Particulate Emissions and Control in Fluidized-Bed Combustion: Modeling and Parametric Performance.
PB85-152973/GAR 515,114

AIR POLLUTION DETECTION

Technical Assistance Document for Monitoring Sulfuric Acid Vapor from Stationary Sources,
PB85-143261/GAR 514,713

Evaluation of Cryogenic Trapping As a Means for Collecting Organic Compounds in Ambient Air,
PB85-144046/GAR 515,239

Proceedings: National Symposium on Recent Advances in Pollutant Monitoring of Ambient Air and Stationary Sources, Held at Radison Plaza Raleigh Hotel, on May 8-10, 1984.
PB85-144053/GAR 515,240

Kinetics of Nitric Oxide Formation in Laminar and Turbulent Methane Combustion.
PB85-149698/GAR 514,716

AIR POLLUTION EFFECTS (HUMANS)

Asbestos: Expedience, Exposure, and Human Experience,
HRP-0906074/0/GAR 514,617

Review and Evaluation of the Evidence for Cancer Associated with Air Pollution.
PB85-142016/GAR 514,670

NO2 and Health Effects: Analysis of Selected Studies. Phase 2.
PB85-149714/GAR 514,674

AIR POLLUTION SAMPLING

Ambient Monitoring of Pollutants Around Synfuel Plants.
PB85-142701/GAR 515,100

Technical Assistance Document for Monitoring Sulfuric Acid Vapor from Stationary Sources,
PB85-143261/GAR 514,713

Proceedings: National Symposium on Recent Advances in Pollutant Monitoring of Ambient Air and Stationary Sources, Held at Radison Plaza Raleigh Hotel, on May 8-10, 1984.
PB85-144053/GAR 515,240

Studies of the Mechanisms and Rates with Which Nitrogen Species are Incorporated into Cloud Water and Precipitation.
PB85-144350/GAR 514,419

Air Sampling Devices. March 1976-January 1985 (Citations from the Energy Data Base).
PB85-854792/GAR 515,252

AIR SAMPLERS

Air Sampling Devices. March 1976-January 1985 (Citations from the Energy Data Base).
PB85-854792/GAR 515,252

AIR SOURCE HEAT PUMPS

Predicted Energy Savings for a Residential Heat Pump Utilizing a Fluidized-Bed Heat Exchanger.
DE85002467/GAR 515,070

AIR WATER INTERACTIONS

Dynamics of Coupled Ice-Ocean System in the Marginal Ice Zone: Study of the Mesoscale Processes and of Constitutive Equations for Sea Ice.
N85-13448/4/GAR 514,776

AIRCRAFT CONSTRUCTION MATERIALS

Les Materiaux Structuraux Modernes Situation Actuelles et Perspectives d'Evolution (Modern Structural Materials. Present Situation and Evolution Prospects).
N85-12886/6/GAR 514,335

L'Electroformage du Nickel (Electroforming of Nickel).
N85-13085/4/GAR 515,148

AIRCRAFT CONTROL

High-Temperature Optically Activated GaAs Power Switching for Aircraft Digital Electronic Control.
N85-12901/3/GAR 514,337

Unified Method for Evaluating Real-Time Computer Controllers: A Case Study.
N85-13478/1/GAR 514,342

AIRCRAFT DESIGN

Natural Laminar Flow Airfoil Design Considerations for Winglets on Low-Speed Airplanes.
N85-12863/5/GAR 514,319

Physics on Aircraft Wakes.
N85-12871/8/GAR 514,323

AIRCRAFT ENGINES

Static Jet Noise Test Results of Four 0.35 Scale-Model QCGAT(Quiet Clean General Aviation Turbofan) Mixer Nozzles.
N85-13551/5/GAR 515,689

AIRCRAFT INSTRUMENTS

Realistic Localizer Courses for Aircraft Instrument Landing Simulators.
N85-12885/8/GAR 514,531

System Status Display Information.
N85-12889/0/GAR 514,341

Robustesse des Regulateurs de Pilotage Multivariables Continus: Synthese de l'Etude (Strength of Continuous Multivariable Piloting Regulators: Study Synthesis),
PB85-140853/GAR 514,343

Robustesse de Regulateurs de Pilotage Multivariables (Strength of Multivariable Piloting Regulators),
PB85-141570/GAR 514,344

AIRCRAFT NOISE

Static Jet Noise Test Results of Four 0.35 Scale-Model QCGAT(Quiet Clean General Aviation Turbofan) Mixer Nozzles.
N85-13551/5/GAR 515,689

Evaluation of the Langley 4- by 7-Meter Tunnel for Propeller Noise Measurements.
N85-13553/1/GAR 515,229

AIRCRAFT STRUCTURES

Graphische Software Zur Darstellung der Deformationsbewegung Eines Koerpers (Graphics Software for the Display of Body Deformation Motion).
N85-12888/2/GAR 514,336

Composite Structural Materials.
N85-12966/6/GAR 514,974

Seuil de Detectabilite des Defauts dans les Assemblages Rives, Proces-Verbal No.44-833/F (Defect Detection Threshold in Riveted Joints, Test Report No.44-833/F).
N85-13260/3/GAR 515,256

AIRFOIL PROFILES

Premiers Essais Cryogeniques du Profil Cast 7 a la Soufflerie T2. Comparaisons Avec les Calculs (First Cryogenic Test of the Cast 7 Profile in the T2 Wind Tunnel. Comparison with Calculations).
N85-13682/8/GAR 514,325

AIRFOILS

Study of Flow Past an Airfoil with a Jet Issuing from Its Lower Surface.
N85-12860/1/GAR 514,316

Natural Laminar Flow Airfoil Design Considerations for Winglets on Low-Speed Airplanes.
N85-12863/5/GAR 514,319

Comparison of Wortmann Airfoil Computer-Generated Lift and Drag Polars with Flight and Wind Tunnel Results.
N85-12868/4/GAR 514,321

Role of Freestream Turbulence Scale in Subsonic Flow Separation.
N85-12870/0/GAR 514,322

AIRFRAME MATERIALS

Full-Scale Crash-Test Evaluation of Two Load-Limiting Subfloors for General Aviation Airframes.
N85-13267/8/GAR 514,338

AIRLAND BATTLE

AirLand Battle Execution -- Some Implications of Deep Attack.
AD-A148 948/3/GAR 515,269

ALASKA POWER ADMINISTRATION

Alaska Electric Power Statistics, 1960-1983. Ninth Edition.
DE85000436/GAR 514,931

ALCOHOL USAGE

Drinking and Driving Habits, Attitudes, and Behaviour of Male Motorists.
PB85-138436/GAR 514,548

ALCOHOLS

Development of Acceptance Criteria for Batches of Silane Primer for External Tank Thermal Protection System Bonding Applications.
N85-13043/3/GAR 514,681

ALGAE

Microalgae Culture Collection, 1984-1985.
DE84013035/GAR 514,568

Photosynthetic Water Splitting.
DE85002460/GAR 515,654

ALIPHATIC COMPOUNDS

Etude, par la Methode de Coin, de la Composition B2141 (SNPE): Correlation entre l'Amorcabilite et la Formulation d'un Explosif a Liant Plastique (Wedge-Technique Investigation of Composite Explosive B2141 (SNPE). Correlation between Ignitability and Formation of an Explosive with Plastic Bond),
PB85-141596/GAR 515,502

ALKALI METAL COMPOUNDS

Laboratory/Bench Scale Testing and Evaluation of A.P.T. Dry Plate Scrubber. Fifty-Fifth Monthly Report, September 1-September 30, 1984.
DE85001015/GAR 515,088

ALKANES

Liquid Phase Products and Solid Deposit Formation from Thermally Stressed Model Jet Fuels.
N85-13066/4/GAR 515,668

ALKENES

Metal-Catalyzed Rearrangement of Alkene-Alkynes and the Stereochemistry of Metallacyclobutene Ring Opening.
AD-A149 084/6/GAR 514,690

ALKYNES

Metal-Catalyzed Rearrangement of Alkene-Alkynes and the Stereochemistry of Metallacyclobutene Ring Opening.
AD-A149 084/6/GAR 514,690

ALLOY-HT-9

Design and Use of Nonstandard Tensile Specimens for Irradiated Materials Testing.
DE85001071/GAR 514,987

ALPHA-BEARING WASTES

Waste Accountability, Shipping, and Packaging (WASP) Handbook.
DE85001535/GAR 515,381

ALTERNATIVE PLANNING

Feasibility Study of Alternative Technology for Small Community Water Supply.
PB85-143287/GAR 515,102

ALUMINIUM

Differential Thermal Analysis Study of U sub 3 Si-Al and U sub 3 Si sub 2 -Al Reactions.
DE85002647/GAR 515,489

Calculation of Si(Li) X-Ray Detector Efficiencies.
DE85002732/GAR 515,211

ALUMINIUM BASE ALLOYS

Theta Pinch Discharges for Solids Vaporization and Elemental Chemical Analysis. Technical Progress Report.
DE85002968/GAR 514,700

ALUMINIUM OXIDES

Thermal Conductivities for Sintered and Sphere-Pac Li sub 2 O and gamma exp - LiAlO sub 2 Solid Breeders with and Without Irradiation Effects.
DE85000775/GAR 515,315

ALUMINUM ALLOYS

Perfectionnement des Lois de Fissuration par Fatigue sous Chargement Complexe (Perfecting the Fatigue Cracking Laws under Complex Loads),
PB85-145068/GAR 515,006

ALUMINUM OXIDES

Structural Changes During Milling of Aluminum Oxide Powders.
N85-13008/6/GAR 514,959

KEYWORD INDEX

AMBIGUITY FUNCTIONS
Ambiguity Function of Random Binary-Phase-Coded Waveforms.
AD-A148 906/1/GAR *514,857*

AMERICIUM
Actinide Separations by Supported Liquid Membranes.
DE84013462/GAR *515,386*

AMERICIUM 241
In Situ Vitrification Pilot-Scale Radioactive Test.
DE85002671/GAR *515,416*

AMINES
Mode of Action of Polyamine Analogues on the Growth and Biochemistry of Leishmanial Cells.
AD-A148 857/6/GAR *514,637*

AMMONIA
Photosynthesis of Ammonia.
DE85001482/GAR *514,677*

Studies of the Kinetics and Mechanisms of Ammonia Synthesis and Hydrodesulfurization on Metal Single Crystal Surfaces.
DE85001650/GAR *514,697*

AMMUNITION
Characterization of Novel Binders Based on Energetic Thermoplastic Elastomers.
AD-A148 993/9/GAR *515,017*

AMORPHOUS MATERIALS
Development of Rapidly Quenched Alloys with Special Physical Properties and of Processes for Their Continuous Production.
N85-13039/1/GAR *514,996*

AMPHIBIANS
Amphibian Chromomycosis.
AD-A148 874/1/GAR *514,567*

AMPHIBOLES
Mineralogical Characteristics of Asbestos.
PB85-143675 *514,750*

ANAEROBIC PROCESSES
Biological Gasification of Renewable Resources.
PB85-156966/GAR *515,675*

Anaerobic Digestion of Biomass: Status Summary and Research and Development Needs, 1983 (Condensed Version).
PB85-159457/GAR *515,676*

ANALOG TO DIGITAL CONVERTERS
Development of Components for Micro-C Oriented Sensor Systems.
N85-13215/7/GAR *515,224*

ANALYTIC FUNCTIONS
Interpolating Sequences for H to Infinity in the Ball.
N85-13542/4/GAR *515,045*

ANCHORS
General Engineering Specifications for 6000 Tpd SRC-I Demonstration Plant.
DE85000032/GAR *515,610*

ANCHORS (MARINE)
Model and Small-Scale Tests to Evaluate the Performance of Drag Anchors in Combination.
AD-A148 867/3/GAR *515,173*

ANEMOMETERS
Possibilites d'Application de l'Anemometrie Laser a l'Etude de l'Interaction Cho/Couche Limite en Transsonique (Possibilities of Applying Laser Anemometry to an Investigation of the Interaction Shock/Boundary Layer in Transonic Flight).
PB85-144533/GAR *514,327*

ANIMALS
Use of Capture Data to Quantify Change and Test for Effects on the Abundance of Wild Populations.
DE85002155/GAR *514,571*

Animal Traction: Guidelines for Utilization.
PB85-146058/GAR *514,369*

ANNULAR NOZZLES
Experimental Investigation of Shock-Cell Noise Reduction for Single Stream Nozzles in Simulated Flight.
N85-13550/7/GAR *515,688*

ANNULAR SPACE
Leakage-Flow-Induced Vibration of a Tube-in-Tube Slip Joint.
DE84007301/GAR *515,427*

ANORTHOSITE
Particle Velocity Experiments in Anorthosite and Gabbro.
N85-13407/0/GAR *514,747*

ANTENNA ARRAYS
A Proof of the Odd-Symmetry of the Phases for Minimum Weight Perturbation Phase-Only Null Synthesis.
AD-A148 976/4/GAR *514,862*

ANTENNA DESIGN
Conceptual Design for Scaled Truss Antenna Flight Experiment.
N85-12932/8/GAR *515,717*

ANTENNA RADIATION PATTERNS
Nulling at Symmetric Pattern Location with Phase-Only Weight Control.
AD-A148 940/0/GAR *514,861*

A Proof of the Odd-Symmetry of the Phases for Minimum Weight Perturbation Phase-Only Null Synthesis.
AD-A148 976/4/GAR *514,862*

ANTENNAS
Conceptual Design for Scaled Truss Antenna Flight Experiment.
N85-12932/8/GAR *515,717*

ANTHRAQUINONES
Mode of Action of Polyamine Analogues on the Growth and Biochemistry of Leishmanial Cells.
AD-A148 857/6/GAR *514,637*

ANTHRAX
Anthrax Toxin.
AD-A148 936/8/GAR *514,668*

ANTIBODIES
Monoclonal Antibodies to Serotype 2 and Serotype 15 Outer Membrane Proteins of Neisseria meningitidis and Their Use in Serotyping.
AD-A148 970/7/GAR *514,581*

Genetic Engineering: Monoclonal Antibodies. 1980-February 1985 (Citations from the U. S. Patent Data Base).
PB85-855369/GAR *514,600*

ANTIGENS
Crystallization of the Protective Antigen Protein of Bacillus anthracis,
AD-A148 938/4/GAR *514,634*

Expression of Lipopolysaccharide O Antigen in Escherichia coli K-12 Hybrids Containing Plasmid and Chromosomal Genes from Shigella dysenteriae 1.
AD-A148 942/6/GAR *514,580*

ANTILEISHMANIAL AGENTS
Mode of Action of Polyamine Analogues on the Growth and Biochemistry of Leishmanial Cells.
AD-A148 857/6/GAR *514,637*

Army Drug Development Program. Phase I. Clinical Testing.
AD-A148 919/4/GAR *514,638*

ANTIMALARIALS
Army Drug Development Program. Phase I. Clinical Testing.
AD-A148 919/4/GAR *514,638*

ANTIPARASITIC DRUGS
Mode of Action of Polyamine Analogues on the Growth and Biochemistry of Leishmanial Cells.
AD-A148 857/6/GAR *514,637*

ANTIREFLECTION COATINGS
Sol-Gel-Derived AR Coatings for Solar Receivers.
DE85000192/GAR *514,696*

APPLICANTS
Review of the Tri-Service Academy and ROTC Scholarship Manpower Requirements as They Relate to the Decreasing High School Graduate Resource.
AD-A149 089/5/GAR *514,524*

APPROXIMATION (MATHEMATICS)
Controlled Approximation and a Characterization of the Local Approximation Order.
AD-A149 095/2/GAR *515,036*

AQUACULTURE
Environmental Assessment on Construction of the Cabinet Gorge Kokanee Hatchery.
DE85000785/GAR *514,569*

Environmental Assessment on Construction of the Minthorn Springs Creek Juvenile Acclimation and Adult Holding Facility.
DE85000918/GAR *514,570*

AQUATIC PLANTS
An Experimental Investigation of Enhanced Harpacticoid (Copepoda) Abundances Around Isolated Seagrass Shoots.
AD-A148 918/6/GAR *514,731*

ARCHAEOLOGY
Yaughan and Curriboo Plantations: Studies in Afro-American Archaeology.
AD-A148 985/5/GAR *514,508*

Archeological/Historical Review of the Garrison Creek Watershed and the Effect of Channel Construction on Cultural Resources.
PB85-144640/GAR *514,509*

Archaeological Investigations at the Spring Creek Site (34Ln-76), Lincoln County, Oklahoma.
PB85-144657/GAR *514,510*

Archeological Testing Work, Multi-Purpose Impoundment 4M, Robinson Creek Watershed, Lincoln County, Oklahoma.
PB85-144665/GAR *514,559*

Geomorphology and Archaeology of Carnegie Canyon, Fort Cobb Laterals Watershed, Caddo County, Oklahoma.
PB85-144673/GAR *514,511*

Report of Archeological Work Conducted in the Okfuskee County Tributaries Watershed between 1979 and 1984; and Analysis of the Historic Components at the Cow Creek Site, 340f-24.
PB85-145654/GAR *514,512*

ARCHITECTURE
Human Role in Space. Volume 3: Generalizations on Human Roles in Space.
N85-13475/7/GAR *515,711*

ARCTIC REGIONS
MIZEX (Marginal Ice Zone Program): A Program for Mesoscale Air-Ice-Ocean Interaction Experiments om Arctic Marginal Ice Zones. V. MIZEX 84. Summer Experiment PI (Principal Investigator) Preliminary Reports,
AD-A148 986/3/GAR *514,774*

AREA DEFENSE
Defending the Frontier: A Study of the U.S. Army in the Defense of the Nebraska Frontier in the Years 1849-1853.
AD-A149 067/1/GAR *515,272*

ARGON
Effect of Inert Gases on Ion Transport Across the Erythrocyte Membrane.
AD-A148 889/9/GAR *514,644*

ARIANE LAUNCH VEHICLE
Les Systemes de Lancements (Launching Systems).
N85-12917/9/GAR *515,721*

ARID LAND
Mauritania: Rural Assessment Manpower Surveys - Dryland Agriculture.
PB85-144228/GAR *514,357*

ARID LANDS
Transport Assessment - Arid: Measurement and Prediction of Water Movement Below the Root Zone.
DE85000834/GAR *515,398*

ARMING SEQUENCE
Calculation through Fault Tree Analysis of the Probability of a Warhead Being Armed Prior to Launch,
AD-P004 339/8/GAR *515,274*

ARMORED VEHICLES
Fire Support Team Vehicle (FIST-V) System: An Analysis of Human Factors, Training, Safety and Related Considerations.
AD-A149 070/5/GAR *515,504*

ARMS
Planning of Minimum-Time Trajectories for Robot Arms.
AD-A148 956/6/GAR *515,162*

ARMS CONTROL
Counterforce Deadlock: Are Arms Control Agreements Still Possible.
AD-A148 872/5/GAR *514,493*

ARMY
E. C. Meyer, General, United States Army, Chief of Staff, June 1979-June 1983.
AD-A149 006/9/GAR *514,520*

ARMY EQUIPMENT
Equipment Profiles for Major Items of Engineer Equipment.
AD-A149 091/1/GAR *515,119*

ARMY INTELLIGENCE
Thoughts on SOF Deployment for Deep Battle HUMINT Operations.
AD-A149 072/1/GAR *515,262*

ARMY NURSE CORPS
Army Nurse Corps Personnel Management Practices (Executive Summary).
AD-A148 890/7/GAR *514,579*

ARMY OPERATIONS
AirLand Battle Execution -- Some Implications of Deep Attack.
AD-A148 948/3/GAR *515,269*

Defending the Frontier: A Study of the U.S. Army in the Defense of the Nebraska Frontier in the Years 1849-1853.
AD-A149 067/1/GAR *515,272*

ARMY PERSONNEL
Ethics and the Army Officer: An Assessment and Recommendations for the Future.
AD-A148 949/1/GAR *514,517*

Leadership Development in the Civilian Work Force.
AD-A148 955/8/GAR *514,518*

ARMY PLANNING
US Army Test and Evaluation Command Test Operations Procedure 'Durability'.
AD-A149 003/6/GAR *515,198*

ARMY RESEARCH
US Army Test and Evaluation Command Test Operations Procedure 'Durability'.
AD-A149 003/6/GAR *515,198*

ARMY TRAINING
Evaluation of an Advanced Combat Vehicle Identification (CVI) Training Program (Masking): A New Approach to Target Acquisition Training.
AD-A148 911/1/GAR *514,516*

AROMATIC COMPOUNDS
Liquid Phase Products and Solid Deposit Formation from Thermally Stressed Model Jet Fuels.
N85-13066/4/GAR *515,668*

Method for Making Heterocyclic Block Copolymers.
PAT-APPL-6-610 912/GAR *514,685*

ARRAYS
Investigations in Array Sizing. Part 1. Accuracy of the Sizing Process.
PB85-151637 *515,250*

ARTIFICIAL INTELLIGENCE
Qualitative Process Theory.
AD-A148 967/1/GAR *514,810*

Technologies for Space Station Autonomy.

N85-12906/2/GAR 515,713

Definition of Technology Development Missions for Early Space Station Satellite Servicing. Volume 1. Executive Summary.
N85-12922/9/GAR 515,707

Expert Computer Systems. February 1984-January 1985 (Citations from the INSPEC: Information Services for the Physics and Engineering Communities Data Base).
PB85-855401/GAR 514,847

ARTIFICIAL LIMBS

Planning of Minimum-Time Trajectories for Robot Arms.
AD-A148 956/6/GAR 515,162

Boston Elbow.
PB85-145936/GAR 514,629

ASBESTOS

Asbestos: Expedience, Exposure, and Human Experience.
HRP-0906074/0/GAR 514,617

Mineralogical Characteristics of Asbestos.
PB85-143675 514,750

ASSEMBLING

Fiabilite Composants et Technologies d'Assemblage (Component Reliability and Assembling Technologies).
N85-13258/7/GAR 515,153

ASSISTANCE

Analyze and Make Recommendations on Information and Assistance Needs and Resources from the Perspective of the Medicaid Agencies.
PB85-145829/GAR 514,561

ASSURANCE

ESA(European Space Agency) Product Assurance Specification System: Explanatory Note.
N85-13259/5/GAR 515,720

ASTRONOMICAL CATALOGS

Documentation for the Machine-Readable Version of the MK Classification Extension Catalogue Morris-Kennedy (1983).
N85-13491/4/GAR 514,382

Documentation for the Machine-Readable Version of the Perth 75: A Catalogue of Positions of 2589 FK4 and Fk4s Stars (Nikoloff and Hog 1982).
N85-13492/2/GAR 514,383

Documentation for the Machine-Readable Version of the AGK3 Star Catalogue of Positions and Proper Motions North of -2 Deg .5 Declination (Dieckvoss and Collaborators 1975).
N85-13493/0/GAR 514,384

ASTRONOMICAL MODELS

Far-Infrared Photometry of Compact Extragalactic Sources: OJ 187 and BL Lac.
N85-13701/6/GAR 514,389

ASTRONOMICAL OBSERVATORIES

Study of Instrument Design Options for the Columbus Spectroscopy Mission.
N85-13205/8/GAR 515,223

ASTRONOMY

Research and Technology, 1984: Marshall Space Flight Center.
N85-13765/1/GAR 514,433

ATF TORSATRON

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DE85001701/GAR 515,324

Design Description of the Vacuum Vessel for the Advanced Toroidal Facility.
DE85002561/GAR 515,332

ATLANTIC OCEAN

Fontes de Calor Nos Tropicos E Escoamentos Anoma Los de Larga Escala Associadas COM Anomalias de Precipitacao No Nordeste Do Brasil (Heat Sources in the Tropics and Large Scale Flow Anomalies Associated with Precipitation Anomalies in Northeast Brazil).
N85-13421/1/GAR 514,414

ATMOSPHERIC ATTENUATION

Atmospheric Effects on Laser Beams. 1975-February 1985 (Citations from the NTIS Data Base).
PB85-855104/GAR 514,409

ATMOSPHERIC CHEMISTRY

Research and Technology, 1984: Marshall Space Flight Center.
N85-13765/1/GAR 514,433

ATMOSPHERIC CONDENSATION

Studies of the Mechanisms and Rates with Which Nitrogen Species are Incorporated into Cloud Water and Precipitation.
PB85-144350/GAR 514,419

ATMOSPHERIC DENSITY

Global Matrix of Thermospheric Density Values for Selected Solar/Geomagnetic Conditions and Spacecraft Orbital Attitudes.
N85-13409/6/GAR 514,407

ATMOSPHERIC TIDES

Thermospheric Energy Flux of the Semidiurnal Tide.
AD-A149 029/1/GAR 514,404

ATMOSPHERIC TRANSMISSIVITY

Atmospheric Effects on Laser Beams. 1975-February 1985 (Citations from the NTIS Data Base).
PB85-855104/GAR 514,409

ATOM MOLECULE INTERACTIONS

Energieuebertraege bei Atom-Molekuel-Streuexperimenten AM Beispiel der Systeme SF6-AR, CF4-Ne und Xe-CO2 im I 1 Ev-Bereich (Energy Transfer in Atom-Molecule Scattering Experiments in the 1EV Region with SF6-AR, CF4-Ne and Xe-CO2 Systems as Examples).
N85-13588/7/GAR 514,708

ATOM PROBE FIELD ION MICROSCOPY

Approach to Realism in Field Ion Microscopy via Zone Electropolishing.
PB85-151579 515,249

ATOMIC COLLISIONS

Velocity-Changing Collisional Effects in Nonlinear Atomic Spectroscopy and Photon Echo Decay in Gases.
N85-13559/8/GAR 514,707

Energieuebertraege bei Atom-Molekuel-Streuexperimenten AM Beispiel der Systeme SF6-AR, CF4-Ne und Xe-CO2 im I 1 Ev-Bereich (Energy Transfer in Atom-Molecule Scattering Experiments in the 1EV Region with SF6-AR, CF4-Ne and Xe-CO2 Systems as Examples).
N85-13588/7/GAR 514,708

Laboratory Studies of Atomic Collision Processes of Importance in Planetary Atmospheres.
N85-13758/6/GAR 514,397

ATOMIC SPECTRA

Velocity-Changing Collisional Effects in Nonlinear Atomic Spectroscopy and Photon Echo Decay in Gases.
N85-13559/8/GAR 514,707

ATOMIC THEORY

Basic Research on Macromolecular Dynamics.
PB85-152833/GAR 515,015

ATTACK

AirLand Battle Execution -- Some Implications of Deep Attack.
AD-A148 948/3/GAR 515,269

ATTENTION

Selecting One Among the Many: A Simple Network Implementing Shifts in Selective Visual Attention.
AD-A148 989/7/GAR 514,545

ATTITUDE CONTROL

Analise E Simulacao de Um Sistema Inercial (Strapdown) de Determinacao de Atitude Auxiliado Por Estimacao Adaptativa DA Deriva (Analysis and Simulation of an Intertial System (Strapdown) for Auxiliary Attitude Determination by Adaptive Drift Estimation).
N85-12882/5/GAR 515,303

ATTITUDE SURVEYS

Population Growth and Development in Egypt: Farmers' and Rural Development Officials' Perapectives,
PB85-141681/GAR 514,350

ATTITUDES

Drinking and Driving Habits, Attitudes, and Behaviour of Male Motorists.
PB85-138436/GAR 514,548

ATTRACTANTS

Ovipositional Stimulant for Trichogramma Spp.
PATENT-4 484 539 514,602

AUDIO TAPES

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PB85-855021/GAR 515,254

AUDITS

Standard Operating Procedures for Conducting Sampling and Sample Bank Audits,
PB85-143279/GAR 515,238

AUSTENITIC STAINLESS STEELS

Evaluation of Welded and Repair-Welded Stainless Steel for Light Water Reactor (LWR) Service: Compositional Effects on the Sensitization of Austenitic Stainless Steels.
NUREG/CR-3918/GAR 514,990

Creep Characterization of a Type 316 Austenitic Steel,
PB85-139665/GAR 515,001

AUSTRIA

Energy Raw Materials in the Alps-Adria Region.
DE84770506/GAR 514,889

AUTOMATIC FREQUENCY CONTROL

Carrier Acquisition and Tracking by a COSTAS Loop with Automatic Frequency Control.
N85-13149/8/GAR 515,288

AUTOMATIC LANDING CONTROL

Flight Tests of the Digital Integrated Automatic Landing System (Dials).
N85-12900/5/GAR 515,304

AUTOMATIC PILOTS

Robustesse des Regulateurs de Pilotage Multivariables Continus: Synthese de l'Etude (Strength of Continuous Multivariable Piloting Regulators: Study Synthesis),
PB85-140853/GAR 514,343

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AUTOMOBILE ENGINES

Advanced Automotive Diesel Assessment Program.
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Evaluation of Heat Engine for Hybrid Vehicle Application.
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AUTOMOBILES

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AUXILIARY POWER SOURCES

Ion Thruster System (8-cm) Cyclic Endurance Test.
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AUXILIARY PROPULSION

Ion Thruster System (8-cm) Cyclic Endurance Test.
N85-12937/7/GAR 515,603

BACILLUS ANTHRACIS

Demonstration of a Capsule Plasmid in Bacillus anthracis,
AD-A148 935/0/GAR 514,633

Anthrax Toxin,
AD-A148 936/8/GAR 514,668

Crystallization of the Protective Antigen Protein of Bacillus anthracis,
AD-A148 938/4/GAR 514,634

BACKGROUND RADIATION

Elimination of Sensor Artifacts from Infrared Data.
AD-A149 048/1/GAR 515,298

Search for the Radiative Decay of a Cosmic Relic Particle with IUE.
N85-13707/3/GAR 514,394

BACTERIA

Heterotrophic Bacteria in Potable Water: Progress in Method Options and Monitoring Benefits,
PB85-144152/GAR 515,105

BACTERIAL TOXINS

Anthrax Toxin,
AD-A148 936/8/GAR 514,668

BACTERIOPHAGES

Mistranslation of the mRNA Encoding Bacteriophage T7 0.3 Protein.
AD-A148 875/8/GAR 514,632

BAFFLES

Active Baffle Development under ACSAS Task II Hydrophone and Inner Decoupler.
AD-A148 877/4/GAR 515,253

BALL BEARINGS

Effect of Two Inner-Ring Oil-Flow Distribution Schemes on the Operating Characteristics of a 35 Millimeter Bore Ball Bearing to 2.5 Million Dn.
N85-13233/0/GAR 515,165

BALLISTICS

Acceleration Measurements in High G Environments.
AD-A148 896/4/GAR 515,506

Plaques Polyurethannes pour Blindages Transparents (Polyurethane Plates for Transparent Blinding),
PB85-144525/GAR 515,510

BARIUM TITANATES

Process of Synthesizing Mixed BaO-TiO2 Based Powders for Ceramic Applications.
PAT-APPL-6-671 539/GAR 514,963

BARRIERS

Labor Markets and Industry in Egypt: Analysis and Recommendations for Employment Oriented Growth,
PB85-136968/GAR 514,466

BASALT

Mathematical Modeling and Evaluation of Radionuclide Transport Parameters from the ANL Laboratory Analog Program.
DE85000782/GAR 515,393

BAY OF PIGS

Explaining the Bay of Pigs and Vietnam, 1965 Decisions.
AD-A149 030/9/GAR 515,271

BAYS (TOPOGRAPHICAL FEATURES)
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PB85-142719/GAR *514,738*

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Perturbation of a Multiple Eigenvalue in the Benard Problem for Two Fluid Layers.
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BENEFICIATION
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Diffusion of Plutonium in Compacted, Brine-Saturated Bentonite.
DE85002440/GAR *515,413*

BERYLLIUM
Nondestructive Method for Detecting Machine Damage in Beryllium.
DE85001074/GAR *515,203*

Calculation of Si(Li) X-Ray Detector Efficiencies.
DE85002732/GAR *515,211*

BERYLLIUM ALLOYS
Design and Use of Nonstandard Tensile Specimens for Irradiated Materials Testing.
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BETA DOSIMETRY
Personnel Radiation Dosimetry Symposium: Program and Abstracts.
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BIOCIDES

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BIOCONVERSION

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BIOMASS

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BLAST

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BLAST LOADS

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BLAST RESISTANT SHELTERS

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AD-A148 895/6/GAR 515,190

BLOCK COPOLYMERS

Characterization of Novel Binders Based on Energetic Thermoplastic Elastomers.
AD-A148 993/9/GAR 515,017

Method for Making Heterocyclic Block Copolymers.
PAT-APPL-6-610 912/GAR 514,685

BLOCKING

Freezing and Blocking of Water Pipes.
AD-A148 943/4/GAR 515,175

BLOOD CIRCULATION

Hemodynamics Responses to Upright Tilt at Sea Level and High Altitude,
AD-A148 848/5/GAR 514,661

BLOOD FLOW

Tests of the Application of the Radioactive Microsphere Technique to the Measurement of Regional Myocardial Blood Flow,
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BNL

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BOATTAIL AFTERBODIES

Optimization of Boattails for Small Arms Bullets,
PB85-143758/GAR 515,503

BOILERS

Three-Dimensional Analysis of Heat Transfer and Gas Flow in a Radiant Furnace.
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BOLIVIA

Prevalencia de Bocio Endemico en la Poblacion escolar de Bolivia (Prevalence of Endemic Goiter in the School Population of Bolivia),
PB85-137925/GAR 514,505

BOLTED JOINTS

Improving the Fatigue Life of the Mirage IIIO Wing Main Spar.
AD-A149 054/9/GAR 514,333

BOLTS

Isolation Valves of Steam Generators (Hopkinsons Valves) - Broken Bolts. Evaluation Report.
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BONDED JOINTS

Long Term Durability of Urea Formaldehyde Glued Joints Removed from Vampire Aircraft.
AD-A149 053/1/GAR 514,332

BONES

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Boron Derivatives of 3-Methylpyrazole.
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BOREHOLES

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BOREL SETS

Measure Determining Classes of Balls in Banach Space.
N85-13541/6/GAR 515,044

BORIDES

Program to Develop Thermite Reactions to Produce Refractory Borides and Carbides.
AD-A148 972/3/GAR 515,145

BORON COMPOUNDS

Structures of Three Pyrazaboles: 1,3,5,7-Tetramethylpyrazabole; 4,4-Bis(pyrazol-1'-yl)pyrazabole; 4,4,8,8-Tetrakis(pyrazol-1'yl)pyrazabole.
AD-A148 995/4/GAR 514,687

BOROSILICATE GLASS

Assessing the Performance of Geologic Repositories for Nuclear Waste.
DE85001197/GAR 515,399

BOSTON ELBOWS

Boston Elbow.
PB85-145936/GAR 514,629

BOUNDARY LAYER FLOW

Local Slot Boundary Condition for Transonic Flow Calculations in Slotted-Wall Test Sections of Wind Tunnels.
N85-12879/1/GAR 515,219

Progress in the Development of a Two-Fluid Model of Turbulence for Near-Wall Flows, Part 1.
N85-13196/9/GAR 515,535

Progress in the Development of a Two-Fluid Model of Turbulence for Near-Wall Flows. Part 3: Preliminary Investigation of a Stably-Stratified Boundary Layer.
N85-13197/7/GAR 515,536

Etude Experimentale d'une Couche Limite Turbulente Incompressible sur une Paroi Courbe (Experimental Study of a Turbulent Incompressible Boundary Layer on a Curved Wall).
PB85-145001/GAR 515,541

BOUNDARY LAYER SEPARATION

Role of Freestream Turbulence Scale in Subsonic Flow Separation.
N85-12870/0/GAR 514,322

BOUNDARY LAYER TRANSITION

Natural Laminar Flow Airfoil Design Considerations for Winglets on Low-Speed Airplanes.
N85-12863/5/GAR 514,319

KEYWORD INDEX

BOUNDARY LAYERS
Grenzschichtuntersuchungen im Transonic-Kanal des Eidgenoessisches Flugzwerke, Emmen (Investigations of Boundary Layers in the Emmen Federal Aircraft Works Transonic Tunnel, Switzerland).
N85-12877/5/GAR 515,217

BOUNDARY VALUE PROBLEMS
Program Design for an Adaptive, Non-Linear Finite Element Solver.
AD-A148 880/8/GAR 514,802
Neumann Type Boundary Conditions for Hamilton-Jacobi Equations.
AD-A149 069/7/GAR 515,031
Symmetry Breaking for a Class of Semi-Linear Elliptic Problems.
AD-A149 093/7/GAR 515,034
Interval Mathematics Reports.
N85-13536/6/GAR 515,042

BOW WAVES
Magnetohydrodynamic and Gasdynamic Theories for Planetary Bow Waves.
N85-13760/2/GAR 514,399

BRAIN
Multiple Resources and Brain Laterality.
AD-A148 912/9/GAR 514,645

BRASSES
Corrosions des Laitons de Robinetterie (Corrosion of Brass in Potable Water Service).
N85-13037/5/GAR 514,994

BRAZIL
Ventures in the Informal Sector, and How They Worked Out in Brazil.
PB85-140509/GAR 514,472

BREAKDOWN (ELECTRONIC THRESHOLD)
Flashover Failures from Wet-Wire Arcing and Tracking.
AD-A149 055/6/GAR 514,849

BREATHING APPARATUS
Experiments with Hydrox at 1.3 Mpa (13 ATM).
N85-13471/6/GAR 514,622

BREEDING BLANKETS
Integrated-Blanket-Coil (IBC) Concept Applied to the Poloidal Field and Blanket Systems of a Tokamak Reactor.
DE85000437/GAR 515,312
Thermal Conductivities for Sintered and Sphere-Pac Li sub 2 O and gamma exp - LiAlO sub 2 Solid Breeders with and Without Irradiation Effects.
DE85000775/GAR 515,315

BRIGHTNESS
Individual Differences in Chromatic Brightness Matching.
AD-A148 882/4/GAR 515,549

BUCKLING
Buckling Analysis for Rectangular Orthotropic Plates with Centrally Located Cutouts.
N85-13268/6/GAR 515,578
Formulations et Methodes de Resolution des Problemes Classiques du Flambage Statique (Formulation and Solution Methods for Classical Problems of Static Buckling).
N85-13280/1/GAR 515,580

BUILDING MATERIALS
Project on Sulfur Dioxide Removal and Waste Products Utilization Process. Final Report.
DE84017333/GAR 515,064

BUILDINGS
General Engineering Specifications for 6000 Tpd SRC-I Demonstration Plant.
DE85000031/GAR 515,609
Recommendations for Energy Conservation Standards and Guidelines for New Commercial Buildings. Volume III. Description of the Test Process. Appendix C: Life-Cycle Code Documentation.
DE85003152/GAR 514,917

BUILT IN TEST EQUIPMENT
Built-In Test Equipment for Electronic Systems. 1975-January 1985 (Citations from the INSPEC: Information Services for the Physics and Engineering Communities Data Base).
PB85-855153/GAR 514,851

BUNYAVIRUSES
Mechanisms of Bunyavirus Virulence: A Genetic Approach.
AD-A149 058/0/GAR 514,635

BUREAU OF INDIAN AFFAIRS
Better Management of Information Resources at the Bureau of Indian Affairs Could Reduce Waste and Improve Productivity.
PB85-144178/GAR 514,838

BURNERS
Noise Emission of Technical Diffusion Flames in Dependence of Mixing Parameters, Burner Dimensions and Air Preheating for Fuel Gases with Different Flame Velocities.
DE84770498/GAR 515,595

BURNS (INJURIES)
Proceedings of the International Burn Research Conference Held at San Antonio, Texas on 19-21 January 1983.
AD-A149 033/3/GAR 514,582

BUS CONDUCTORS
Fiber Optic Data Bus Using Frequency Division Multiplexing (FDM) (Frequency Division Multiplexing) and an Asymmetric Coupler.
N85-13139/9/GAR 515,284

BUTANE/METHYL
Thermodynamic Properties of Isobutane-Isopentane Mixtures from 240 to 600K and up to 20 MPa (with Supplemental Tables from -40 to + 600F and up to 1000 psia).
PB85-154581/GAR 514,725

BUTANES
Thermodynamic Properties of Isobutane-Isopentane Mixtures from 240 to 600K and up to 20 MPa (with Supplemental Tables from -40 to + 600F and up to 1000 psia).
PB85-154581/GAR 514,725

BUTENES
Hydrodesulfurization by Reduced Molybdenum Sulfides: Activity and Selectivity of Chevrel Phase Catalysts.
DE85002613/GAR 514,698

BWR TYPE REACTORS
Fuel and Control Rod Failure Behavior During Degraded Core Accidents.
DE84014535/GAR 515,430
Thermal-Hydraulic Uncertainties Affecting Severe Accident Progression.
DE84017381/GAR 515,434
MARCON - Development and Applications to Containment Loading Calculations.
DE85002442/GAR 515,384

CABLES
Development of a Prototype Flat Winding Machine for Winding Air Deployed Fiberoptic Cable.
AD-A149 038/2/GAR 515,164

CABLES (ROPES)
Methode d'Essais de Telecabines (Test Methods for Cable Cars).
N85-13282/7/GAR 515,228

CADMIUM
Organic Complexant-Enhanced Mobility of Toxic Elements in Low-Level Wastes.
DE85002375/GAR 515,410
Effects of Cadmium on the Population Growth of a Benthic Invertebrate Aeolosoma Headleyi (Oligochaeta).
PB85-144079 514,671

CADMIUM COMPOUNDS
Alpha-Form of the Hydroxides of Bivalent Metals.
N85-13009/4/GAR 514,705

CAJANUS CAJAN
Pigeonpeas (Cajanus cajan Millsp.): A Valuable Crop of the Tropics.
PB85-143105/GAR 514,375

CALCIUM ISOTOPES
Mound Activities in Chemical and Physical Research: January-June 1984.
DE85002552/GAR 515,340

CALIBRATION
Acceleration Measurements in High G Environments.
AD-A148 896/4/GAR 515,506
Acoustic Emission Transducer Calibration by Means of the Seismic Surface Pulse.
AD-A148 921/0/GAR 515,513
General Purpose Signal Conditioning.
AD-A149 002/8/GAR 514,863

CALORIMETERS
Automated Servo Controlled Calorimetry.
DE85002527/GAR 515,206

CAMAC SYSTEM
Versatile CAMAC Power Supply Controller-Monitor with Built-in Ramping and Ripple Monitor.
DE85002666/GAR 515,210

CAMEROON
Private Sector: Ethnicity, Individual Initiative, and Economic Growth in an African Plural Society. The Bamileke of Cameroon.
PB85-140192/GAR 514,552
Private Sector: The Tortoise Walk. Public Policy and Private Activity in the Economic Development of Cameroon.
PB85-143048/GAR 514,480

CANCER
Postoperative Adjuvant Therapy of Breast Cancer.
PB84-922808/GAR 514,587
Review and Evaluation of the Evidence for Cancer Associated with Air Pollution.
PB85-142016/GAR 514,670

CANTILEVER MEMBERS
Flutter Parametric Studies of Cantilevered Twin-Engine Transport Type Wing with and Without Winglet. Volume 2: Transonic and Density Effect Investigations.
N85-13270/2/GAR 514,340

CAPACITORS
Surface-Wave Displacement: Absolute Measurements Using a Capacitive Transducer.
AD-A148 920/2/GAR 515,197
Pulse Injection on a Power Cable Penetrating a Shielding Wall by Feed-Through Capacitors.
N85-13171/2/GAR 514,793

CAPITATION FEE
Case Management and Prepaid Capitation as a Cost-Effective and Improved Method of Delivery of Dental Services: Massachusetts Dental Project.
PB85-146116/GAR 514,595

CARBIDES
Program to Develop Thermite Reactions to Produce Refractory Borides and Carbides.
AD-A148 972/3/GAR 515,145

CARBON
Transfer of Particulate Organic Carbon and Nitrogen from the Yangtze River to the Ocean.
AD-A148 931/9/GAR 514,752
Calculation of Si(Li) X-Ray Detector Efficiencies.
DE85002732/GAR 515,211
Chemistry and Morphology of Coal Liquefaction. Annual Report, October 1, 1983-September 30, 1984.
DE85003056/GAR 515,666
Limitations on the Efficiency of the Solar Photoreduction of Carbon.
PB85-151330/GAR 514,717

CARBON DIOXIDE
Promoter Modifications of Catalytic Activity and Selectivity. Progress Report, April 1, 1984-October 1, 1984.
DE85000424/GAR 515,619
6000 Tpd SRC-I Demonstration Plant Gas Systems. Design Baseline Package. Volume 4.
DE85001662/GAR 515,629
Changing Climate. Report of the Carbon Dioxide Assessment Committee.
DE85001845/GAR 514,413
Importance of Active Sites for Char Gasification in Oxygen (Air) and Carbon Dioxide.
PB85-155984/GAR 515,673

CARBON DIOXIDE INJECTION
Enhanced Recovery of Oil from Subsurface Reservoirs with Carbon Dioxide. Final Report.
DE85000109/GAR 514,759

CARBON DIOXIDE LASERS
Investigation of RF Excited CW CO2 Waveguide Lasers.
N85-13221/5/GAR 515,546

CARBON FIBER REINFORCED PLASTICS
Les Materiaux Structuraux Modernes Situation Actuelles et Perspectives d'Evolution (Modern Structural Materials. Present Situation and Evolution Prospects).
N85-12886/6/GAR 514,335
Optimisation de l'Injection des Thermoplastiques Thermostables Peek Renforces de Fibres Courtes de Carbone (Optimization of the Injection Process for Thermostatic Polyether-Ether-Ketone (Peek) Thermoplastics Reinforced with Short Carbon Fibers).
N85-13062/3/GAR 515,013

CARBON FIBERS
Composite Structural Materials.
N85-12966/6/GAR 514,974

CARBON MONOXIDE
Promoter Modifications of Catalytic Activity and Selectivity. Progress Report, April 1, 1984-October 1, 1984.
DE85000424/GAR 515,619
Optical Second Harmonic Generation for Surface Studies.
DE85000670/GAR 515,519
6000 Tpd SRC-I Demonstration Plant Gas Systems. Design Baseline Package. Volume 4.
DE85001662/GAR 515,629
Laser-Based Diagnostics for Coal Gasification Instrumentation.
DE85002385/GAR 515,652

CARBON TETRACHLORIDE
Synthesis of Some Highly Silylated Aminophosphines and Their Reactions with Carbon Tetrachloride.
AD-A149 066/3/GAR 514,684

CARBON TETRAXHLORIDE
Synthesis of Some Highly Silylated Aminophosphines and Their Reactions with Carbon Tetrachloride.
AD-A149 066/3/GAR 514,684

CARCINOGENESIS
Postoperative Adjuvant Therapy of Breast Cancer.
PB84-922808/GAR 514,587

CARCINOMA
Squamous Cell Carcinoma with Metastasis in a Rhesus Monkey (Macaca mulatta).
AD-A148 869/1/GAR 514,578

CARNEGIE CANYON
Geomorphology and Archaeology of Carnegie Canyon, Fort Cobb Laterals Watershed, Caddo County, Oklahoma.
PB85-144673/GAR 514,511

CARRIER FREQUENCIES
Carrier Acquisition and Tracking by a COSTAS Loop with Automatic Frequency Control.
N85-13149/8/GAR 515,268

CASCADE REACTORS
Comparison of Three ICF Reactor Designs.
DE85001211/GAR 515,320

CASKS
Conceptual Design Report for a Remotely Operated Cask Handling System. Revision 1.
DE85001194/GAR 515,380

CAST ALLOYS
Development of Rapidly Quenched Alloys with Special Physical Properties and of Processes for Their Continuous Production.
N85-13039/1/GAR *514,996*

CASTING
Program to Develop Thermite Reactions to Produce Refractory Borides and Carbides.
AD-A148 972/3/GAR *515,145*

Development of Rapidly Quenched Alloys with Special Physical Properties and of Processes for Their Continuous Production.
N85-13039/1/GAR *514,996*

CATALOGING
H8-1 and H8-2 Cataloging Handbooks.
PB85-120483/GAR *514,451*

CATALYSIS
Metal-Catalyzed Rearrangement of Alkene-Alkynes and the Stereochemistry of Metallacyclobutene Ring Opening.
AD-A149 084/6/GAR *514,690*

CATALYSTS
Reactive Sintering of SiC.
N85-13010/2/GAR *514,960*

Zeolites in Catalysis. June 1983-February 1985 (Citations from the Energy Data Base).
PB85-854826/GAR *515,677*

CAVITIES
Some Aspects of the Micromechanics of Hot Spot Formation in Energetic Materials,
AD-P004 348/9/GAR *515,495*

CAVITY RECEIVERS
Solid Particle Receiver Experiments: Velocity Measurements.
DE85000257/GAR *515,201*

CAVITY RESONATORS
Image Line Voltage Controlled Oscillator with Replaceable Components.
PAT-APPL-6-679 971/GAR *514,866*

Coaxial Cavity Gunn Oscillator Using Probe Coupled Microstrip.
PAT-APPL-6-679 972/GAR *514,867*

CDC-170 COMPUTERS
Computer Center CDC Libraries.
AD-A149 005/1/GAR *514,812*

CELL LINES
Immortal Line of Human Fetal Glial Cells.
PAT-APPL-6-657 630/GAR *514,572*

CELLULAR RADIO
Cellular Radio. 1975-February 1985 (Citations from the INSPEC: Information Services for the Physics and Engineering Communities Data Base).
PB85-854966/GAR *515,295*

CELLULOSE
Modified Extruder for Feeding Fine-Ground Cellulosic Slurries to Pressure Systems. Final Report, 1978-1980.
DE85001688/GAR *515,630*

CENTRAL AMERICA
Analysis of Watershed Management (El Salvador, Guatemala, Honduras).
PB85-141745/GAR *515,099*

CENTRIFUGE ENRICHMENT PLANTS
Pilot Program for an Automated Data Collection System.
DE84016809/GAR *515,473*

CENTRIFUGES
Multi-Layer Coil Countercurrent Chromatograph with Adjustable Revolutional Radius.
PATENT-4 487 693 *515,234*

CERAMIC COATINGS
Plasma and Flame Sprayed Coatings. 1980-February 1985 (Citations from the Engineering Index Data Base).
PB85-854982/GAR *514,969*

CERAMIC MATERIALS
Effect of Powder Characteristics on Microstructure and Properties in Alkoxide Prepared PZT Ceramics.
AD-A149 082/0/GAR *514,958*

CERAMICS
Structural Changes During Milling of Aluminum Oxide Powders.
N85-13006/6/GAR *514,959*

Reactive Sintering of SiC.
N85-13010/2/GAR *514,960*

Study of the Pore Structure of Ceramics Prepared by the Slip Casting Method.
N85-13048/2/GAR *514,962*

CESIUM 137
WESF sup 137 Cs gamma Ray Sources.
DE85000676/GAR *515,562*

In Situ gamma-Ray Spectrometric Analysis of Radionuclide Distributions at a Commercial Shallow Land Burial Site.
DE85002376/GAR *515,411*

In Situ Vitrification Pilot-Scale Radioactive Test.
DE85002671/GAR *515,416*

CHARPY IMPACT TEST
Instrumented Impact Testing Machine with Reduced Specimen Oscillation Effects.
N85-13218/1/GAR *515,227*

CHARS
Plasticity, Agglomeration and Volatiles Secondary Reactions in Coal Pyrolysis. Annual Report, September 10, 1982-February 29, 1984.
DE85002492/GAR *515,655*

Importance of Active Sites for Char Gasification in Oxygen (Air) and Carbon Dioxide.
PB85-155984/GAR *515,673*

CHEMICAL ANALYSIS
Official Journey to USA, November 1983. Symposium on the Compatibility of Explosives; Mound Laboratory; Naval Surface Weapons Center.
N85-13072/2/GAR *515,500*

Coal Tar Technology. 1970-February 1985 (Citations from the NTIS Data Base).
PB85-854974/GAR *515,678*

CHEMICAL COMPOUNDS
Analytical Reference Standards and Supplemental Data: The Pesticides and Industrial Chemicals Repository.
PB85-143766/GAR *514,714*

CHEMICAL DERIVATIVES
Boron Derivatives of 3-Methylpyrazole.
AD-A148 980/6/GAR *514,682*

CHEMICAL EFFLUENTS
Environmental Chemistry of Oil Shale Development. Interim Technical Progress Report, January 1-September 30, 1984.
DE85001408/GAR *515,628*

CHEMICAL ENGINEERING
Activities Report in Technology.
N85-13681/0/GAR *514,432*

Snapshot of the NBS (National Bureau of Standards) Center for Chemical Engineering.
PB85-151751 *514,680*

CHEMICAL EXPLOSIVES
DOE Hazard Classification for Insensitive High Explosives (IHE).
DE84017002/GAR *515,496*

Detonation E.O.S. Patterns for Several Explosives.
DE85001039/GAR *515,499*

CHEMICAL LASERS
Mise au Point d'un Laser HF de Faible Puissance (Perfecting a Low-Power HF Laser),
PB85-145076/GAR *515,548*

CHEMICAL ORDNANCE
USAWC (United States Army War College) Military Studies Program. Logistical Support for Chemical Special Ammunition in a Theater of Operations.
AD-A148 861/8/GAR *515,258*

CHEMICAL REACTION MECHANISMS
Studies of the Mechanisms and Rates with Which Nitrogen Species are Incorporated into Cloud Water and Precipitation.
PB85-144350/GAR *514,419*

Kinetics of Nitric Oxide Formation in Laminar and Turbulent Methane Combustion.
PB85-149698/GAR *514,716*

CHEMICAL REACTIONS
Fuel Cell Reaction in Super Acid Electrolytes.
PB85-155976/GAR *514,726*

CHEMICAL REACTORS
Heavy Oil Processing Utilizing the Dynacracking Process. Final Report.
DE85000176/GAR *515,613*

Study of Multiphase Flow Useful to Understand Scaleup of Coal Liquefaction Reactors. 1981-1984 Final Report.
DE85001312/GAR *515,627*

Toward New Coal Hydroprocessing and Liquefaction Catalysts. Progress Report, August 1983-December 1983.
DE85002800/GAR *515,665*

CHEMICAL WARFARE AGENTS
Guidelines - Design to Minimize Contamination and to Facilitate Decontamination of Military Vehicles and Other Equipment: Interiors and Exteriors.
AD-A149 088/7/GAR *515,259*

CHEMISORPTION
Reaction of Oxygen-Nitrogen Mixtures with Granular Activated Carbons below the Spontaneous Ignition Temperature.
AD-A149 041/6/GAR *514,689*

Characterization of Surfaces Using Electron and Photon Stimulated Desorption.
PB85-151587 *514,718*

Importance of Active Sites for Char Gasification in Oxygen (Air) and Carbon Dioxide.
PB85-155984/GAR *515,673*

CHERENKOV COUNTERS
Large Acceptance Spectrometers for pi exp 0 Mesons.
DE85002472/GAR *515,357*

CHILDBEARING
Adolescent Pregnancy and Childbearing: Findings from Research,
SHR-0011823/GAR *514,563*

CHILDREN
Prevalencia de Bocio Endemico en la Poblacion escolar de Bolivia (Prevalence of Endemic Goiter in the School Population of Bolivia),
PB85-137925/GAR *514,505*

Children and Women in Traditional and Cash Crop Agriculture: A Preliminary Cross-Section Study of Economic Development in Guatemala,
PB85-143709/GAR *514,355*

CHLORIDES
Chloride Movement Across Basolateral Membrane of Necturus Epithelium.
AD-A148 929/3/GAR *514,648*

Laboratory/Bench Scale Testing and Evaluation of A.P.T. Dry Plate Scrubber. Fifty-Fifth Monthly Report, September 1-September 30, 1984.
DE85001015/GAR *515,088*

CHOLINESTERASE INHIBITORS
Anticholinesterase Effects on Number and Function of Brain Muscarinic Receptors and Central Cholinergic Activity: Drug Intervention.
AD-A148 973/1/GAR *514,640*

CHROMATE COATINGS
Chromate Coatings for the Protection of Aluminum and Zinc Surfaces. 1966-February 1985 (Citations from the Metals Abstracts Data Base).
PB85-854834/GAR *514,967*

CHROMATICITY
Individual Differences in Chromatic Brightness Matching.
AD-A148 882/4/GAR *515,549*

CHROMATOGRAPHY
Multi-Layer Coil Countercurrent Chromatograph with Adjustable Revolutional Radius.
PATENT-4 487 693 *515,234*

CHROMOMYCOSIS
Amphibian Chromomycosis.
AD-A148 874/1/GAR *514,567*

CHROMOSPHERE
Time Dependent Effects at the Foot of the Chromosphere.
N85-13762/8/GAR *514,401*

CIRCUIT BREAKERS
Improvement of Lightning Arresters Energy Capability.
N85-13172/0/GAR *514,794*

Closeout of IE Bulletin 79-09: Failures of GE Type AK-2 Circuit Breakers in Safety-Related Systems.
NUREG/CR-3791/GAR *514,790*

CIRCUIT PROTECTION
Improvement of Lightning Arresters Energy Capability.
N85-13172/0/GAR *514,794*

CIRCUIT RELIABILITY
Procedures for Precap Visual Inspection.
N85-13156/3/GAR *515,149*

Qualification of a Thick Film Hybrid.
N85-13170/4/GAR *514,864*

CIRCULATION
TEA: A Linear Frequency Domain Finite Element Model for Tidal Embayment Analysis.
PB85-142719/GAR *514,738*

CIVIL AFFAIRS
Toward a Theory of Military Involvement in National Development in Underdeveloped Countries.
AD-A148 998/8/GAR *514,497*

CIVIL-MILITARY RELATIONS
Toward a Theory of Military Involvement in National Development in Underdeveloped Countries.
AD-A148 998/8/GAR *514,497*

CIVILIAN PERSONNEL
Leadership Development in the Civilian Work Force.
AD-A148 955/8/GAR *514,518*

Department of Defense Civilian Manpower Statistics.
AD-A149 019/2/GAR *514,521*

CLASSIFICATIONS
Documentation for the Machine-Readable Version of the MK Classification Extension Catalogue Morris-Kennedy (1963).
N85-13491/4/GAR *514,382*

CLASSIFIED INFORMATION
Education and Training Plan for the US DOE Office of Classification.
DE85003169/GAR *514,530*

CLAUS PROCESS
6000 Tpd SRC-I Demonstration Plant Gas Systems. Design Baseline Package. Volume 10.
DE85001217/GAR *515,625*

CLEAN AIR ACT
Maps Depicting Nonattainment Areas Pursuant to Section 107 of the Clean Air Act - 1984,
PB85-140630/GAR *515,097*

CLISTORONIA MAGNIFICA
Effects of Copper, Nickel and Zinc on the Life Cycle of the Caddisfly 'Clistoronia magnifica' (Limnephilidae).
PB85-144111/GAR *514,573*

CLOUD COVER
Investigations of Severe/Tornadic Thunderstorm Development and Evolution Based on Satellite and AVE/Sesame/VAS Data.
N85-13424/5/GAR *514,416*

KEYWORD INDEX

CLOUDS (METEOROLOGY)
Studies of the Mechanisms and Rates with Which Nitrogen Species are Incorporated into Cloud Water and Precipitation.
PB85-144350/GAR *514,419*

CMS (CIVILIAN MANPOWER STATISTICS)
Department of Defense Civilian Manpower Statistics.
AD-A149 019/2/GAR *514,521*

COAL
Wet Grinding Versus Dry Grinding for Deep Cleaning Ultrafine Coal by Flotation. Technical Progress Report.
DE84017086/GAR *514,756*

Indonesia - Energy Situation 1982/83.
DE84770487/GAR *514,886*

Coal Pyrolysis in Flat Opposed Jet Combustion Configurations. Interim Technical Progress Report, May 30, 1984-August 31, 1984.
DE85000351/GAR *515,618*

Direct Coal Combustion Data Handbook.
DE85001028/GAR *515,624*

Cost and Quality of Fuels for Electric Utility Plants, November 1981.
DE85002290/GAR *515,647*

Monthly Energy Review, June 1984.
DE85002448/GAR *515,653*

Plasticity, Agglomeration and Volatiles Secondary Reactions in Coal Pyrolysis. Annual Report, September 10, 1982-February 29, 1984.
DE85002492/GAR *515,655*

Coal Production, 1983.
DE85002522/GAR *515,659*

Chemistry and Morphology of Coal Liquefaction. Annual Report, October 1, 1983-September 30, 1984.
DE85003056/GAR *515,666*

Program of Basic Research on the Preparation and Stability of Coal/Water Slurries. Quarterly Report.
DE85003172/GAR *514,766*

Coal and Gas Pipeline Feasibility Study. Volume II. Technical and Economic Evaluation.
FE-2707-T1(V.2)/GAR *514,767*

Petrographic and Fluorescence Spectral Properties of Liptinite and Vitrinite Coal Macerals.
PB85-154722/GAR *515,672*

COAL FINES
Wet Grinding Versus Dry Grinding for Deep Cleaning Ultrafine Coal by Flotation. Technical Progress Report.
DE84017086/GAR *514,756*

Program of Basic Research on the Preparation and Stability of Coal/Water Slurries. Quarterly Report.
DE85003172/GAR *514,766*

COAL-FIRED GAS TURBINES
In-House Coal-Fuels Combustion Technology for Use with Gas Turbines.
DE84009248/GAR *515,605*

COAL-FIRED MHD GENERATORS
MHD Generator Electrode Development. Summary Report, July 1, 1981-September 30, 1982.
DE85002156/GAR *514,938*

COAL FIRED POWER PLANTS
Etat des Connaissances Relatives a l'Utilisation en Remblais Routiers de Cendres Volantes de Fraiche Production Provenant d'une ou de Plusieurs Centrales Electriques (Study of Physical Characteristics of Freshly Produced Fly-Ash from the Exhaust Gases of Coal-Fired Power Stations).
PB85-139426/GAR *515,094*

COAL GASIFICATION
Direct Coal Combustion Data Handbook.
DE85001028/GAR *515,624*

Laser-Based Diagnostics for Coal Gasification Instrumentation.
DE85002385/GAR *515,652*

Plasticity, Agglomeration and Volatiles Secondary Reactions in Coal Pyrolysis. Annual Report, September 10, 1982-February 29, 1984.
DE85002492/GAR *515,655*

COAL INDUSTRY
Critical Points in the Coal Fuel Cycle: A Modeling Analysis. Final Report, 1 July 1983-30 June 1984.
DE85001891/GAR *515,632*

Coal Production, 1983.
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COAL LIQUEFACTION
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COASTS
Eulerian-Lagrangian Analysis of Pollutant Transport in Shallow Water.
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COATINGS
Evaluation of Titanium Diboride Gun Tube Coatings.
AD-A148 901/2/GAR *515,511*

Strategy for Selection of Tribological Coatings.
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COBALT 60
In Situ gamma-Ray Spectrometric Analysis of Radionuclide Distributions at a Commercial Shallow Land Burial Site.
DE85002376/GAR *515,411*

In Situ Vitrification Pilot-Scale Radioactive Test.
DE85002671/GAR *515,416*

COBALT COMPOUNDS
Alpha-Form of the Hydroxides of Bivalent Metals.
N85-13009/4/GAR *514,705*

COCKS
Bruit Robinet/Fluctuations de Pression. Etude du Comportement Acoustique des Equipments Hydrauliques du Batiment en Fonction de la Temperature (Tap Noise-Pressure Fluctuations. Study of the Acoustic Behavior of Hydraulic Equipment in Buildings as a Function of the Temperature).
N85-13201/7/GAR *515,179*

COEFFICIENT OF FRICTION
Proposal for Wall Function for Friction and Heat Transfer in the Presence of Roughness and Mass Transfer.
N85-13198/5/GAR *515,537*

COGENERATION
Summary of District Heating and Cooling Project in Moorhead, Minnesota.
DE85002608/GAR *514,940*

Follow-On 40-kW Field Test Support.
PB85-151322/GAR *514,926*

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Bistatic Coherent Radar Receiving System.
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COHESION
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COLD GAS
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N85-13193/6/GAR *515,516*

COLIFORM BACTERIA
'Klebsiella' Occurrence, Significance and Detection in Water Systems: A Progress Report,
PB85-144160/GAR *514,636*

COLLAPSE
Some Aspects of the Micromechanics of Hot Spot Formation in Energetic Materials,
AD-P004 348/9/GAR *515,495*

COLLISIONS
Collision Detection for Moving Polyhedra.
AD-A148 961/6/GAR *515,049*

COLLOIDS
Combustion Waves in Dispersed-2-Phase Mixtures.
N85-13003/7/GAR *514,704*

COLOR
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COMBAT FORCES
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COMBAT READINESS
Data Base Development for Ship Readiness Analyses.
AD-A149 036/6/GAR *514,814*

COMBAT SUPPORT
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COMBAT VEHICLES
Evaluation of an Advanced Combat Vehicle Identification (CVI) Training Program (Masking): A New Approach to Target Acquisition Training.
AD-A148 911/1/GAR *514,516*

COMBINED COLLECTORS
Analysis of Concentrating PV-T Systems for the Commercial/Industrial Sector. Volume IV. Design Analysis and Trade-off Study.
DE85002650/GAR *514,910*

COMBUSTION
Effects of Perforation L/D Ratio and Slotting on Stick Propellant Combustion.
AD-A148 854/3/GAR *515,490*

Research in Nonlinear Problems of Energy. Informal Technical Progress Report.
DE85001529/GAR *515,596*

Capabilities of Laser Diagnostics for Combustion and Flowfields.
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Kinetics of Nitric Oxide Formation in Laminar and Turbulent Methane Combustion.
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COMBUSTION PRODUCTS
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PB85-149714/GAR *514,674*

COMETARY ATMOSPHERES
Outer Satellite Atmospheres: Their Nature and Planetary Interactions.
N85-13759/4/GAR *514,398*

COMMERCE
Price Distortions and Growth in Developing Countries.
PB85-141620/GAR *514,477*

Distorsions des Prix et Croissance dans les Pays en Developpement (Price Distortions and Growth in Developing Countries).
PB85-141638/GAR *514,478*

Stability of Commodity Trade Flows in Interregional Input-Output Tables.
PB85-146108/GAR *514,487*

COMMERCIAL BUILDINGS
Design of Energy-Responsive Commercial Buildings.
DE84013046/GAR *515,062*

COMMERCIAL EQUIPMENT
Impact of the AT and T (American Telephone and Telegraph) Divestiture on the Strategic Air Command.
AD-A148 957/4/GAR *515,281*

COMMODITIES
Stability of Commodity Trade Flows in Interregional Input-Output Tables.
PB85-146108/GAR *514,487*

COMMUNICATION AND RADIO SYSTEMS
Air-Land Battle Interdiction Model Corps Communications Module.
AD-A148 853/5/GAR *515,280*

COMMUNICATION NETWORKS
Systeme de Telecommunications Par Satellite Telecom 1 (The Telecom 1 Satellite Telecommunication System).
N85-13147/2/GAR *515,286*

Apollo System Requirements Specification.
N85-13150/6/GAR *515,289*

Test Experience on an Ultrareliable Computer Communication Network.
N85-13514/3/GAR *514,827*

COMMUNICATION SATELLITES
Systeme de Telecommunications Par Satellite Telecom 1 (The Telecom 1 Satellite Telecommunication System).
N85-13147/2/GAR *515,286*

COMMUNICATIONS NETWORKS
Distributing a Distributed Problem Solving Network Simulator,
AD-A149 065/5/GAR *514,816*

Study of the Requirements of an Electronic Message Handling Facility.
AD-A149 087/9/GAR *514,819*

COMMUNICATIONS SATELLITES
Windows for Innovation: A Story of Two Large-Scale Technologies,
PB85-150340/GAR *515,294*

COMMUNITY DEVELOPMENT
Evaluation of Small Enterprise Programs and Projects: Issues in Business and Community Development.
PB85-140168/GAR *514,471*

COMPACT TORUS
Compact Reversed-Field Pinch Reactors (CRFPR): Preliminary Engineering Considerations.
DE85002351/GAR *515,329*

COMPARATOR CIRCUITS
Qualification of a Thick Film Hybrid.
N85-13170/4/GAR *514,864*

COMPATIBILITY
Official Journey to USA, November 1983. Symposium on the Compatibility of Explosives; Mound Laboratory; Naval Surface Weapons Center.
N85-13072/2/GAR *515,500*

COMPLEX TERRAIN MODELS
Scientific Assessment Document on Status of Complex Terrain Dispersion Models for EPA Regulatory Applications.
PB85-138584/GAR *515,091*

COMPONENT RELIABILITY
Procedures for Precap Visual Inspection.
N85-13156/3/GAR *515,149*

Les Composants Electronics pour Applications Spatiales (Electronic Components for Space Applications).
N85-13169/6/GAR *514,849*

Fiabilite Composants et Technologies d'Assemblage (Component Reliability and Assembling Technologies).
N85-13258/7/GAR *515,153*

COMPOSITE MATERIALS
Advanced Artificial Dielectric Materials for Millimeter Wavelength Applications.
AD-A148 960/8/GAR *514,970*

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AD-A149 039/0/GAR *514,972*

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N85-12981/5/GAR *514,977*

Biocompatible Cementitious Dental Compositions.
PATENT-4 486 179 *514,956*

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COMPOSITE STRUCTURES
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AD-A149 039/0/GAR *514,972*

COMPRESSIBILITY EFFECTS
Flutter Parametric Studies of Cantilevered Twin-Engine-Transport Type Wing with and Without Winglet. Volume 1: Low-Speed Investigations.
N85-13269/4/GAR *514,339*

COMPRESSIBLE FLOW
Partikelmitfuehrung in Einem Kompressiblen Wirbel (Particle Entrainment in a Compressible Vortex).
N85-13192/8/GAR *515,532*

COMPRESSION LOADS
Buckling Analysis for Rectangular Orthotropic Plates with Centrally Located Cutouts.
N85-13268/6/GAR *515,578*

COMPRESSORS
Bruit des Petits Groupes Moto-Compresseurs Mobiles. Experimentation de Plusieurs Traitements Acoustiques de Cout Limite et Permettant des Gains Progressifs (Noise in Small Portable Motocompressors. Experiments on Limited-Cost Acoustic Treatments to Obtain Progressive Improvements).
N85-13557/2/GAR *515,694*

Exploitation de Calculs Tridimensionnels dans les Compresseurs Transsoniques (Development of Computations of Three Dimensional Flow through Transonic Compressors).
PB85-140903/GAR *515,540*

COMPUTATIONAL FLUID DYNAMICS
Study of the Structure of Turbulent Shear Flows at Supersonic Speeds and High Reynolds Number.
N85-12865/0/GAR *515,531*

Development of Computational Fluid Dynamics at NASA Ames Research Center.
N85-12866/8/GAR *514,320*

Numerical Calculation of Steady Turbulent Flows in Adverse Pressure Gradients.
N85-13195/1/GAR *515,534*

COMPUTER AIDED DESIGN
Graphics Translators for Computer-Aided Drafting and Design: Interface Alternatives for the A/E Community.
AD-A148 892/3/GAR *514,805*

High Resolution Computed Tomography for Solid Modeling and Computer Aided Design.
DE85000085/GAR *515,147*

Conceptual Design for Scaled Truss Antenna Flight Experiment.
N85-12932/8/GAR *515,717*

Conception de Circuits Assistee Par Ordinateur: Realisation de Masques pour l'Elaboration de Circuits Microondes (Computerized Circuit Designs: Realization of Masks to Manufacture Microwave Circuits).
N85-13168/8/GAR *515,150*

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PB85-855146/GAR *514,874*

COMPUTER AIDED DIAGNOSIS
Design of a Knowledge-Based Fault Detection and Diagnosis System,
AD-A148 859/2/GAR *514,422*

Meta-Level Control through Fault Detection and Diagnosis.
AD-A149 064/8/GAR *514,815*

COMPUTER AIDED INSTRUCTION
Computer Aided Instruction. 1982-February 1985 (Citations from the NTIS Data Base).
PB85-855112/GAR *514,540*

COMPUTER AIDED MANUFACTURING
Conception de Circuits Assistee Par Ordinateur: Realisation de Masques pour l'Elaboration de Circuits Microondes (Computerized Circuit Designs: Realization of Masks to Manufacture Microwave Circuits).
N85-13168/8/GAR *515,150*

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PB85-138824/GAR *515,155*

Computerized Manufacturing Automation: Employment, Education, and the Workplace. Volume 2. Working Papers. Part C: Individual Education and Training Case Studies.
PB85-138832/GAR *515,156*

COMPUTER CODES
Economic Analysis of Three Methods to Dry Biomass Fuels.
DE85000178/GAR *515,614*

MCNP Code.
DE85002565/GAR *515,486*

COMPUTER GRAPHICS
Graphics Translators for Computer-Aided Drafting and Design: Interface Alternatives for the A/E Community.
AD-A148 892/3/GAR *514,805*

Graphische Software Zur Darstellung der Deformationsbewegung Eines Koerpers (Graphics Software for the Display of Body Deformation Motion).
N85-12888/2/GAR *514,336*

Conception de Circuits Assistee Par Ordinateur: Realisation de Masques pour l'Elaboration de Circuits Microondes (Computerized Circuit Designs: Realization of Masks to Manufacture Microwave Circuits).
N85-13168/8/GAR *515,150*

Basis for a Geometric Modeller,
PB85-140861/GAR *514,837*

COMPUTER NETWORKS
Post-Processing of Bibliographic Citations from DOE/RECON, NASA/RECON, and DOD/DROLS. Revision 1.
DE85000617/GAR *514,443*

Test Experience on an Ultrareliable Computer Communication Network.
N85-13514/3/GAR *514,827*

Communication System Supporting Large Datagrams on a Local Area Network.
PB85-139798/GAR *514,834*

COMPUTER PROGRAM VERIFICATION
Report on the Status of the Development of the IEEE (Institute of Electrical and Electronics Engineers) Standard for Software Verification Plans (P1012).
PB85-151769 *514,839*

COMPUTER PROGRAMMING
Functionally Accurate, Cooperative Distributed Systems.
AD-A148 926/9 *514,808*

Managing Permanent Objects.
AD-A149 007/7/GAR *514,813*

Definition of Technology Development Missions for Early Space Station Satellite Servicing. Volume 1. Executive Summary.
N85-12922/9/GAR *515,707*

Concentrator Optical Characterization Using Computer Mathematical Modelling and Point Source Testing.
N85-13375/9/GAR *514,920*

Un Systeme de Documentation Electronique (An Electronic Documentation System).
N85-13683/6/GAR *514,449*

I-PIGS: A Concurrent Programming Environment with Interactive Graphical Support,
PB85-140846/GAR *514,836*

COMPUTER PROGRAMS
Ada (Trademark) Primer.
AD-A148 855/0/GAR *514,801*

Directory of Range Data Conversion and Processing Systems.
AD-A148 996/2/GAR *515,273*

Concentrator Optical Characterization Using Computer Mathematical Modelling and Point Source Testing.
N85-13375/9/GAR *514,920*

Software Used with the Flux Mapper at the Solar Parabolic Dish Test Site.
N85-13376/7/GAR *514,921*

Entwurf und Implementierung Eines Modularen Programmsystems Zur Durchfuehrung Statistischer Analysen (Design and Implementation of a Modular Program System for Statistical Analyses).
N85-13503/6/GAR *514,825*

COMPUTER SOFTWARE
Report on the Status of the Development of the IEEE (Institute of Electrical and Electronics Engineers) Standard for Software Verification Plans (P1012).
PB85-151769 *514,839*

Firmware: Design Techniques and Applications. 1975-February 1985 (Citations from the INSPEC: Information Services for the Physics and Engineering Communities Data Base).
PB85-855377/GAR *514,846*

COMPUTER STORAGE DEVICES
Optical Memory Data Storage. 1975-February 1985 (Citations from the INSPEC: Information Services for the Physics and Engineering Communities Data Base).
PB85-855039/GAR *514,842*

COMPUTER SYSTEMS PERFORMANCE
Analysis of the Impact of Error Detection on Computer Performance.
N85-13477/3/GAR *514,824*

Unified Method for Evaluating Real-Time Computer Controllers: A Case Study.
N85-13478/1/GAR *514,342*

COMPUTER SYSTEMS PROGRAMS
PRIAMUS: Ein Rechenprogramm zur Bestimmung Thermophysikalischer Stoffwerte von Gasmischungen Aus O2, N2, CO, CO7, He, H2O, H2 und CH4 (PRIAMUS, a Computer Program for the Calculation of Thermophysical Properties of Gas Mixtures Containing O2, N2, CO, CO2, He, H2O, H2, CH4).
N85-13002/9/GAR *514,703*

Simulation d'Une Chaine de Transmission a Elements Faiblement Non Lineaires. Calculs des Produits d'Intermodulation sur UN Signal Compose de N Porteuses (Simulation of a Transmission Circuit Composed of Slightly Nonlinear Elements. Computation of the Intermodulation on Signals Composed of N Carriers).
N85-13167/0/GAR *514,859*

Organ-Pipe Oscillation.
N85-13199/3/GAR *515,178*

Laminar Jet Issuing into Stagnant Surroundings.
N85-13200/9/GAR *515,538*

COMPUTER TECHNIQUES
ASEE-NASA Summer Faculty Fellowship Program (Aeronautics and Research), 1984.
N85-13664/6/GAR *514,431*

COMPUTERIZED SIMULATION
Projectile Motion in a Flexible Gun Tube.
AD-A149 022/6/GAR *515,507*

Distributing a Distributed Problem Solving Network Simulator,
AD-A149 065/5/GAR *514,816*

Comparison of Wortmann Airfoil Computer-Generated Lift and Drag Polars with Flight and Wind Tunnel Results.
N85-12868/4/GAR *514,321*

Transmission Analysis for the Use of 2-4 PSK (Phase Shift Keying) Modulation in Satellite Broadcasting.
N85-13151/4/GAR *515,290*

Simulation d'Une Chaine de Transmission a Elements Faiblement Non Lineaires. Calculs des Produits d'Intermodulation sur UN Signal Compose de N Porteuses (Simulation of a Transmission Circuit Composed of Slightly Nonlinear Elements. Computation of the Intermodulation on Signals Composed of N Carriers).
N85-13167/0/GAR *514,859*

Evaluation of Automated Decisionmaking Methodologies and Development of an Integrated Robotic System Simulation.
N85-13516/8/GAR *514,828*

CONCRETE
Repair, Evaluation, Maintenance, and Rehabilitation Research Program. Engineering Condition Survey of Concrete in Service.
AD-A148 893/1/GAR *515,080*

CONCRETES
General Engineering Specifications for 6000 Tpd SRC-I Demonstration Plant.
DE85000032/GAR *515,610*

KEYWORD INDEX

CONDUCTING FLUIDS
Magnetic Inductive Flowmeter for Low Conducting Liquids.
N85-13216/5/GAR *515,225*

CONE VALVES
Fixed-Cone Valve Prototype Tests, New Melones Dam, California.
AD-A148 939/2/GAR *515,174*

CONFERENCES
Important for the Future. Volume VI, Nos. 2-3. Special Issue on the Conference on Small Energy Resources.
DE85001846/GAR *514,906*

Colloquium About Joint Projects within DFVLR/ISRO(Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt/Indian Space Research Organization, Bangalore, Satellite Centre) Cooperation.
N85-12907/0/GAR *515,703*

Tough Composite Materials.
N85-12941/9/GAR *514,973*

Official Journey to USA, November 1983. Symposium on the Compatibility of Explosives; Mound Laboratory; Naval Surface Weapons Center.
N85-13072/2/GAR *515,500*

Digital Image Processing: Report from a Conference and Study Trip to the USA and Canada, Summer 1984.
N85-13153/0/GAR *514,821*

Contribuciones Cientificas Para Conmemorar El 75 Aniversario Del Observatorio Del Ebro (Scientific Contributions in Commemoration of Ebro Observatory's 75TH Anniversary).
N85-13308/0/GAR *514,406*

ASEE-NASA Summer Faculty Fellowship Program (Aeronautics and Research), 1984.
N85-13664/6/GAR *514,431*

Fy 1984 Scientific and Technical Reports, Articles, Papers and Presentations.
N85-13670/3/GAR *514,448*

Conference on the Origin of the Moon.
N85-13709/9/GAR *514,396*

CONFORMAL MAPPING
Conformal Mapping Suitable for Problems Involving Interaction Between Given Geometries and Known Far Fields.
AD-A149 050/7/GAR *515,030*

CONIFERS
NASA/ASEE Summer Faculty Fellowship Program, 1984.
N85-13663/8/GAR *514,380*

CONSTITUTIVE EQUATIONS
Dynamics of Coupled Ice-Ocean System in the Marginal Ice Zone: Study of the Mesoscale Processes and of Constitutive Equations for Sea Ice.
N85-13448/4/GAR *514,776*

CONSTRUCTION
Contingency Analysis for Construction Estimate.
DE84016252/GAR *515,195*

CONSTRUCTION INDUSTRY
Activities Report in Technology.
N85-13681/0/GAR *514,432*

Construction References No. 1, 1984.
PB85-142677/GAR *515,193*

Construction References No. 1, 1983.
PB85-144707/GAR *515,194*

CONTAINERS
Evaluation of the Effects of Gamma Irradiation on the Mechanical Properties of High Density Polyethylene.
NUREG/CR-3898/GAR *515,012*

Fail-Safe Devices for the Prevention of Hazardous Material Spills.
PB85-136642/GAR *515,236*

CONTAINMENT
MARCON - Development and Applications to Containment Loading Calculations.
DE85002442/GAR *515,384*

CONTAINMENT BUILDINGS
Bubble-Induced Mixing of Two Horizontal Liquid Layers with Non-Uniform Gas Injection at the Bottom.
DE85000097/GAR *515,377*

CONTINENTAL SLOPES
RRS FREDERICK RUSSELL Cruise 2/83, 14 January - 8 February 1983. Mooring and CTD Work Along the Continental Slope off the Hebrides and Shetland Isles.
PB85-139517/GAR *514,771*

CONTINUOUS CASTING
Continuous Casting of Copper and It's Alloys.
PB85-140614/GAR *515,004*

CONTRACEPTION
Contraception: A Guide to Birth Planning Methods.
PB85-145670/GAR *514,593*

CONTRACEPTIVES
Birthspacing, Fertility, and Family Planning: Policy and Program Implications from the Malaysian Family Life Survey.
PB85-143774/GAR *514,558*

CONTRACT ADMINISTRATION
Project Management, 1970-January 1985 (Citations from the NTIS Data Base).
PB85-855336/GAR *514,440*

CONTROL ROD WORTHS
Blackness Coefficients, Effective Diffusion Parameters, and Control Rod Worths for Thermal Reactors.
DE85002646/GAR *515,487*

CONTROL ROOMS
Computer-Generated Display System Guidelines. Volume 2. Developing an Evaluation Plan.
DE85000877/GAR *515,346*

CONTROL SIMULATION
Control Aspects of the Schuchuli Village Stand-Alone Photovoltaic Power System.
N85-13157/1/GAR *514,944*

CONTROL STABILITY
Space Shuttle Orbiter Trimmed Center-of-Gravity Extension Study. Volume 8: Effects of Configuration Modifications on the Aerodynamic Characteristics of the 140 a/B Orbiter at a Mach Number of 5.97.
N85-12867/6/GAR *515,712*

Self-Tuning Control of Offset: A Unified Approach.
N85-13520/0/GAR *515,038*

CONTROL SYSTEMS
Note on the Disturbance Decoupling Problem for Retarded Systems.
AD-A149 045/7/GAR *515,026*

Meta-Level Control through Fault Detection and Diagnosis.
AD-A149 064/8/GAR *514,815*

Language Independent Superstructure for Implementing Real-Time Control Systems.
PB85-151801 *514,840*

CONTROL THEORY
Self-Tuning Control of Offset: A Unified Approach.
N85-13520/0/GAR *515,038*

Long-Range Predictive Control Using Weighting-Sequence Models.
N85-13521/8/GAR *515,039*

Robustesse des Regulateurs de Pilotage Multivariables Continus: Synthese de l'Etude (Strength of Continuous Multivariable Piloting Regulators: Study Synthesis).
PB85-140853/GAR *514,343*

Robustesse de Regulateurs de Pilotage Multivariables (Strength of Multivariable Piloting Regulators).
PB85-141570/GAR *514,344*

Kalman Filters. November 1982-February 1985 (Citations from the Engineering Index Data Base).
PB85-855054/GAR *515,048*

CONTROLLERS
Unified Method for Evaluating Real-Time Computer Controllers: A Case Study.
N85-13478/1/GAR *514,942*

CONVECTION
Preliminary Study of Numerical Simulation of Thermosolutal Convection of Interest to Crystal Growth.
N85-13175/3/GAR *515,523*

CONVERGENT-DIVERGENT NOZZLES
Experimental Investigation of Shock-Cell Noise Reduction for Dual-Stream Nozzles in Simulated Flight.
N85-13549/9/GAR *515,687*

Experimental Investigation of Shock-Cell Noise Reduction for Single Stream Nozzles in Simulated Flight.
N85-13550/7/GAR *515,688*

CONVERGENT NOZZLES
Experimental Investigation of Shock-Cell Noise Reduction for Dual-Stream Nozzles in Simulated Flight.
N85-13549/9/GAR *515,687*

Experimental Investigation of Shock-Cell Noise Reduction for Single Stream Nozzles in Simulated Flight.
N85-13550/7/GAR *515,688*

COOLANT LOOPS
Probability of Pipe Failure in the Reactor Coolant Loops of Combustion Engineering PWR Plants. Vol. 3. Double-Ended Guillotine Break Indirectly Induced by Earthquakes.
NUREG/CR-3663-V3/GAR *515,452*

Loop Simulation Capability for Sodium-Cooled Systems.
PB85-144236/GAR *515,469*

COOLING SYSTEMS
User's Guide for the BNW-III Optimization Code for Modular Dry/Wet-Cooled Power Plants.
DE85001456/GAR *514,935*

COOLING TOWERS
Building 1 Cooling Tower Ozone Project.
AD-A148 902/0/GAR *515,058*

Influence of Water Droplets from a Cooling Tower Vapour Cloud on the Deposition of Radioactive Compounds from Waste Plumes from Nuclear Power Stations.
WINDSCALE-TRANS-849/GAR *515,426*

COOPERATIVES
Study of the Cooperative Movement in Honduras.
PB85-133635/GAR *514,346*

COPOLYMERS
Polyactic-Polyglycolic Acid Copolymer Combined with Decalcified Freeze-Dried Bone for Use as a Bone Repair Material.
PAT-APPL-6-658 945/GAR *514,565*

COPPER
Continuous Casting of Copper and It's Alloys.
PB85-140614/GAR *515,004*

COPPER ALLOYS
Design and Use of Nonstandard Tensile Specimens for Irradiated Materials Testing.
DE85001071/GAR *514,987*

Copper-Nickel and Copper-Nickel-Iron. Applications and Corrosion.
PB85-137966/GAR *514,998*

Continuous Casting of Copper and It's Alloys.
PB85-140614/GAR *515,004*

COPPER NICKEL ALLOYS
Copper-Nickel and Copper-Nickel-Iron. Applications and Corrosion.
PB85-137966/GAR *514,998*

Copper Nickel and Copper Nickel Iron: Properties and Processing.
PB85-140028/GAR *515,003*

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PB85-914000/GAR *514,456*

CORIUM
Coolability of UO2 Debris Beds in Pressurized Water Pools: DCC-1 and DCC-2 Experiment Results.
DE84017005/GAR *515,373*

Debris Dispersal in Reactor Material Experiments on Corium-Water Thermal Interactions in Ex-Vessel Geometry.
DE85000077/GAR *515,376*

CORNERS
Stress Intensity Factors for Corner Cracks at Holes Located Near an Edge.
N85-13279/3/GAR *515,579*

CORRELATION TECHNIQUES
More Limit Theory for the Sample Correlation Function of Moving Averages.
AD-A148 975/6/GAR *515,021*

CORROSION
Copper-Nickel and Copper-Nickel-Iron. Applications and Corrosion.
PB85-137966/GAR *514,998*

CORROSION RESISTANCE
Corrosions des Laitons de Robinetterie (Corrosion of Brass in Potable Water Service).
N85-13037/5/GAR *514,994*

CORROSION TESTS
Interactions Between Corrosion and Creep of Uncoated and Coated Superalloys in Sulfate Melts.
N85-13038/3/GAR *514,995*

Method for Evaluating Petrol Products Corrosivity Using Piezoelectric Crystals. Part 2: Instruction Manual.
N85-13073/0/GAR *515,669*

COST ANALYSIS
Occupancy, Income and General Statistics of South African Hotels for 1979.
PB85-141042/GAR *514,474*

Case Management and Prepaid Capitation as a Cost-Effective and Improved Method of Delivery of Dental Services: Massachusetts Dental Project.
PB85-146116/GAR *514,595*

Medical Technology and Costs of the Medicare Program.
PB85-146215/GAR *514,596*

Process and Implementation Issues in the Design and Conduct of Programs to Aid the Reemployment of Dislocated Workers.
PB85-146702/GAR *514,539*

COST EFFECTIVENESS
Human Role in Space. Volume 3: Generalizations on Human Roles in Space.
N85-13475/7/GAR *515,711*

COST REDUCTION
Les Materiaux Structuraux Modernes Situation Actuelles et Perspectives d'Evolution (Modern Structural Materials. Present Situation and Evolution Prospects).
N85-12888/6/GAR *514,335*

COSTA RICA
Private Sector: Costa Rica.
PB85-141679/GAR *514,479*

COUNTERCURRENT SEPARATION
Multi-Layer Coil Countercurrent Chromatograph with Adjustable Revolutional Radius.
PATENT-4 487 693 *515,234*

COUNTERMEASURES
Extracts from Symposium Countersurveillance '83 Held at Melbourne, Australia on 27 and 28 April, 1983.
AD-A149 086/1/GAR *515,299*

COUNTERSURVEILLANCE
Extracts from Symposium Countersurveillance '83 Held at Melbourne, Australia on 27 and 28 April, 1983.
AD-A149 086/1/GAR *515,299*

COUPLERS
Fiber Optic Data Bus Using Frequency Division Multiplexing (FDM) (Frequency Division Multiplexing) and an Asymmetric Coupler.
N85-13139/9/GAR *515,264*

COUPLING (INTERACTION)
Coaxial Cavity Gunn Oscillator Using Probe Coupled Microstrip.
PAT-APPL-6-679 972/GAR *514,867*

COVERINGS
Predicting Long-Term Moisture Contents of Earthen Covers at Uranium Mill Tailings Sites.
DE85000777/GAR *515,392*

Effects of Hydrologic Variables on Rock Riprap Design for Uranium Tailings Impoundments,
NUREG/CR-3752/GAR *515,418*

COVERT OPERATIONS
Explaining the Bay of Pigs and Vietnam, 1965 Decisions.
AD-A149 030/9/GAR *515,271*

CRACK PROPAGATION
Comprehensive Study on Sublaminate Crack Growth Stability and Its Effects on the Load-Carrying Capacity.
AD-A149 037/4/GAR *514,971*

Antiplane Cracks in Solid Propellants,
AD-P004 344/8/GAR *515,699*

CRACK TIPS
Stress Intensity Factors for Corner Cracks at Holes Located Near an Edge.
N85-13279/3/GAR *515,579*

CRACKS
Stress Intensity Factors for Corner Cracks at Holes Located Near an Edge.
N85-13279/3/GAR *515,579*

CRANES (HOISTS)
Risk Analysis of Crane Accidents, Gulf of Mexico OCS Region,
PB85-142743/GAR *515,187*

CRASHWORTHINESS
Full-Scale Crash-Test Evaluation of Two Load-Limiting Subfloors for General Aviation Airframes.
N85-13267/8/GAR *514,338*

CRATERS
Subsidence in the Craters of Nuclear Tests at the Pacific Proving Grounds.
DE85000747/GAR *515,344*

CREATINE PHOSPHOKINASE
An Analysis of Creatine Phosphokinase in the Mucosa and the Muscularis of the Gastrointestinal Tract.
AD-A148 991/3/GAR *514,564*

CREDIT
Rural Financial Markets and Income Distribution in Low Income Countries, Excerpt from Savings and Development,
PB85-134740/GAR *514,347*

Federal Credit Programs for Agriculture: Background for 1985 Farm Legislation.
PB85-136923/GAR *514,348*

Ventures in the Informal Sector, and How They Worked Out in Brazil.
PB85-140598/GAR *514,472*

Effects of Low Interest Rates on the Poor in Low Income Countries,
PB85-143014/GAR *514,353*

CREEP PROPERTIES
Creep Characterization of a Type 316 Austenitic Steel,
PB85-139665/GAR *515,001*

CREEP RUPTURE STRENGTH
Stirling Material Technology.
N85-13007/8/GAR *515,692*

CREEP TESTS
Interactions Between Corrosion and Creep of Uncoated and Coated Superalloys in Sulfate Melts.
N85-13038/3/GAR *514,995*

Sodium Chemistry in the MEL In-Sodium Creep Facilities,
PB85-143139/GAR *515,237*

CREW STATIONS
Human Role in Space. Volume 3: Generalizations on Human Roles in Space.
N85-13475/7/GAR *515,711*

CREWS
Human Role in Space. Volume 2. Research Analysis and Technology Report.
N85-13474/0/GAR *515,710*

CRISIS MANAGEMENT
Strategy, Policy and Contingency Planning. The US Defense Planning Process.
AD-A148 851/9/GAR *515,260*

Explaining the Bay of Pigs and Vietnam, 1965 Decisions.
AD-A149 030/9/GAR *515,271*

CROSS FLOW
Study of Flow Past an Airfoil with a Jet Issuing from Its Lower Surface.
N85-12860/1/GAR *514,316*

CRUDE OIL
Land Treatment of Petroleum Refinery Sludges.
PB85-148708/GAR *515,112*

CRUSTACEA
An Experimental Investigation of Enhanced Harpacticoid (Copepoda) Abundances Around Isolated Seagrass Shoots.
AD-A148 918/6/GAR *514,731*

CRYOCOOLERS
Very-Low-Temperature Cooling Systems.
PB85-151728 *515,589*

Fundamentals of Alternate Cooling Systems.
PB85-151736 *515,590*

CRYOGENIC REFRIGERATORS
Very-Low-Temperature Cooling Systems.
PB85-151728 *515,589*

Fundamentals of Alternate Cooling Systems.
PB85-151736 *515,590*

CRYOGENIC WIND TUNNELS
Premiers Essais Cryogeniques du Profil Cast 7 a la Soufflerie T2. Comparaisons Avec les Calculs (First Cryogenic Test of the Cast 7 Profile in the T2 Wind Tunnel. Comparison with Calculations).
N85-13682/8/GAR *514,325*

CRYSTAL GROWTH
Preliminary Study of Numerical Simulation of Thermosolutal Convection of Interest to Crystal Growth.
N85-13175/3/GAR *515,523*

CRYSTAL LATTICES
Structural Changes During Milling of Aluminum Oxide Powders.
N85-13008/6/GAR *514,959*

Alpha-Form of the Hydroxides of Bivalent Metals.
N85-13009/4/GAR *514,705*

CRYSTAL STRUCTURE
Structures of Three Pyrazaboles: 1,3,5,7-Tetramethylpyrazabole; 4,4-Bis(pyrazol-1'-yl)pyrazabole; 4,4,8,8-Tetrakis(pyrazol-1'yl)pyrazabole.
AD-A148 995/4/GAR *514,687*

Influence of Individual Reflections on the Precision of Parameter Estimates in Least Squares Refinement.
DE85000830/GAR *515,521*

Structural Changes During Milling of Aluminum Oxide Powders.
N85-13008/6/GAR *514,959*

CRYSTALLITES
Structural Changes During Milling of Aluminum Oxide Powders.
N85-13008/6/GAR *514,959*

CRYSTALS
Electron Image Simulation: A Complementary Processing Technique.
DE85000685/GAR *515,520*

CUBAN MISSILE CRISIS
Explaining the Bay of Pigs and Vietnam, 1965 Decisions.
AD-A149 030/9/GAR *515,271*

CUMULUS CLOUDS
Cumulus Cloud Venting of Mixed Layer Ozone,
PB85-144137/GAR *514,408*

CUTTING
Air Abrasive Equipment for the Measurement of Residual Stresses in the Bores of Pipes and Tubes,
PB85-143170/GAR *515,180*

CUTTING TOOLS
Rotating Tool Wear Monitoring Apparatus.
PATENT-4 471 444 *515,169*

CYCLIC LOADS
Autonomous Momentum Management for Space Station.
N85-12931/0/GAR *515,716*

CYCLOHEXENE
Streamer Initiation in Liquid Hydrocarbons under Divergent Field Conditions.
PB85-151611 *515,527*

CZECHOSLOVAKIA
CSSR - Energy Situation 1960/81.
DE84770470/GAR *514,884*

DAMAGE ASSESSMENT
Combat Battle Damage Assessor Expert System,
AD-A148 898/0/GAR *515,268*

DAMS
Dworshak Dam, North Fork Clearwater River, Idaho. Hydraulic Model Investigation.
AD-A148 864/2/GAR *515,079*

DARK ADAPTATION
Relative Effectiveness of Red and White Light for Subsequent Dark-Adaptation.
AD-A148 883/2/GAR *514,662*

Effect of Extreme Peripheral Light on Dark Adaptation.
AD-A148 923/6/GAR *514,647*

DARRIEUS ROTORS
Mini-Modal Testing of Wind Turbines Using Novel Excitation.
DE85000666/GAR *514,902*

DATA
Characteristics of Quality Data.
DE85001203/GAR *514,444*

DATA ACQUISITION
Conference Proceedings of Operational Loads Data Held at Sienna, Italy on 2-6 April 1984,
AD-A149 025/9/GAR *514,329*

DATA ACQUISITION SYSTEMS
Pilot Program for an Automated Data Collection System.
DE84016809/GAR *515,473*

Use of the ORACLE DBMS in Determining the Response of Complex Scientific Instrumentation.
DE85001742/GAR *515,328*

DATA BASE MANAGEMENT SYSTEMS
Human Role in Space. Volume 3: Generalizations on Human Roles in Space.
N85-13475/7/GAR *515,711*

DATA BASES
Data Base Development for Ship Readiness Analyses.
AD-A149 036/6/GAR *514,814*

NASA/ASEE Summer Faculty Fellowship Program, 1984.
N85-13663/8/GAR *514,380*

DATA COLLECTION
Tendencias Recentes na Metodologia de Levantamentos Demograficos em Paises em Desenvolvimento (Recent Methodological Trends in Demographic Investigation in Developing Countries),
PB85-140119/GAR *514,551*

DATA FILE
H8-1 and H8-2 Cataloging Handbooks.
PB85-120483/GAR *514,451*

Interstate Pipeline's Annual Report of Gas Supply, 1981-1983 (FERC-15).
PB85-128064/GAR *514,768*

National Fire Incident Reporting System (NFIRS) Data Base (1983 Equipment/Casualty File).
PB85-132207/GAR *515,184*

National Fire Incident Reporting System (NFIRS) Data Base (1983 Master File).
PB85-132215/GAR *515,185*

National Fire Incident Reporting Systems (NFIRS) Data Base (1983 Incident File).
PB85-132231/GAR *515,186*

DATA MANAGEMENT
Managing Permanent Objects.
AD-A149 007/7/GAR *514,813*

DATA PROCESSING
Directory of Range Data Conversion and Processing Systems.
AD-A148 996/2/GAR *515,273*

Array Processor Utilisation in the Computation of Real-Time Images.
AD-A149 051/5/GAR *515,302*

Metropolitan Statistical Areas (including CMSAs (Consolidated Metropolitan Statistical Areas), PMSAs (Primary Metropolitan Statistical Areas), and NECMAs (New England County Metropolitan Areas)). Category: Data Standards and Guidelines. Subcategory: Representations and Codes.
FIPS PUB 8-5/GAR *514,820*

Formats for Numerical and Textual Data in Data Processing.
N85-13504/4/GAR *514,826*

Better Management of Information Resources at the Bureau of Indian Affairs Could Reduce Waste and Improve Productivity.
PB85-144178/GAR *514,838*

DATA REDUCTION
Human Role in Space. Volume 2. Research Analysis and Technology Report.
N85-13474/0/GAR *515,710*

DATA STORAGE
Optical Memory Data Storage. 1975-February 1985 (Citations from the INSPEC: Information Services for the Physics and Engineering Communities Data Base).
PB85-855039/GAR *514,842*

DATA STORAGE DEVICES
Reliable Stable Storage System for UNIX (Trade Name).
PB85-139780/GAR *514,833*

DATA STORAGE SYSTEMS
Study of the Requirements of an Electronic Message Handling Facility.
AD-A149 087/9/GAR *514,819*

Reliable Stable Storage System for UNIX (Trade Name).
PB85-139780/GAR *514,833*

DATA TAPES
Magnetic Recording Tape. June 1970-January 1985 (Citations from the Engineering Index Data Base).
PB85-855021/GAR *515,254*

DATA TRANSMISSION
Mission Science Value-Cost Savings from the Advanced Imaging Communication System (AICS) (Advanced Imaging Communication System).
N85-12905/4/GAR *515,283*

Modelling, Implementation and Use of a Traffic Simulator for NPDN (Nordic Public Data Network),
PB85-140838/GAR *515,292*

DEBUGGING (COMPUTERS)
A Debugging Tool for Distributed Systems.
AD-A148 916/0 *514,807*

DECAY RATES
Velocity-Changing Collisional Effects in Nonlinear Atomic Spectroscopy and Photon Echo Decay in Gases.
N85-13559/8/GAR *514,707*

DECENTRALIZATION
Building Capacity for Decentralization in Egypt: The Pilot Project and Beyond.
PB85-140036/GAR *514,435*

DECISION MAKING
Explaining the Bay of Pigs and Vietnam, 1965 Decisions.
AD-A149 030/9/GAR *515,271*

System Status Display Information.

KEYWORD INDEX

N85-12869/0/GAR 514,341

DECISION THEORY
Inducao de Regras de Decisao Nebulosas (Induction of Fuzzy Decision Rules).
N85-13525/9/GAR 515,053

Selecao de Projetos de p and D COM Retornos Nao-Numericos (R and D Project Selection with Nonnumerical Returns).
N85-13665/3/GAR 515,054

Dynamic Decision Making.
N85-13668/7/GAR 515,055

DECOMMISSIONING
Closeout Report for the Decontamination and Decommissioning of the 203-S, 204-S, 205-S Facilities.
DE85002502/GAR 515,414

DECOUPLING
Note on the Disturbance Decoupling Problem for Retarded Systems.
AD-A149 045/7/GAR 515,026

DEEP ATTACK STRATEGY
AirLand Battle Execution -- Some Implications of Deep Attack.
AD-A148 948/3/GAR 515,269

DEEP INELASTIC SCATTERING
Nuclear Effects in Deep Inelastic Lepton Scattering.
PB85-139749/GAR 515,565

DEFENSE CONTRACTS
DOD (Department of Defense) Manufacturing Technology Program--Management is Improving but Benefits Hard to Measure.
PB85-144186/GAR 515,264

DEFENSE ECONOMICS
Dimensionering och Finansiering av Gemensamma Resurser (Supply and Financing of Common Resources).
PB85-145910/GAR 514,486

DEFENSE PLANNING
Strategy, Policy and Contingency Planning. The US Defense Planning Process.
AD-A148 851/9/GAR 515,260

DEFIBRILLATORS
Health Equipment Information Number 129, October 1984 (Evaluation Issue).
PB85-135572/GAR 514,623

DEFLAGRATION
Thermal-Mechanical Model of Deflagration-to-Detonation in Granular Energetic Materials,
AD-P004 346/3/GAR 515,593

DEFLECTION
Influence de la Relaxation sur les Caracteristiques Mecaniques d'UN Composite Carbone Epoxy, Proces-Verbal No. 45.427/1 (Influence of Relaxation on the Mechanical Characteristics of a Carbon-Epoxy Composite. Report No. 45.427/1).
N85-12980/7/GAR 514,976

Long Span Bridge Deflections.
PB85-136683/GAR 515,192

DEFLECTORS
Spillway Deflectors at Bonneville, John Day and McNary Dams on Columbia River, Oregon-Washington and Ice Harbor, Lower Monumental and Little Goose Dams on Snake River, Washington. Hydraulic Model Investigation.
AD-A148 863/4/GAR 515,078

DEFORMATION
Process Modeling Applied to Metal Forming and Thermomechanical Processing.
AD-A149 027/5/GAR 515,148

DEHUMIDIFIERS
Performance of the SERI (Solar Energy Research Institute) Parallel-Passage Dehumidifier.
DE85000509/GAR 515,066

DELAY LINES
Improved Magnetic Bias and Delay Linearity in a Magnetostatic Wave Delay Line.
PAT-APPL-6-864 193/GAR 514,795

DEMAND RESPONSIVE TRANSPORTATION SYSTEMS
Underlying Factors in the Development of Demand Responsive Transport in Britain,
PB85-139236/GAR 515,093

DEMODULATION
Carrier Acquisition and Tracking by a COSTAS Loop with Automatic Frequency Control.
N85-13149/8/GAR 515,288

DENSITY (MASS/VOLUME)
Semi-Automated Facilities for Measuring Density, PVT and VLE of Energy-Related Fluids.
PB85-151785 514,723

Universal Representation of the Thermodynamic Properties of Fluids in the Critical Region.
PB85-151793 514,724

DENTAL MATERIALS
Biocompatible Cementitious Dental Compositions.
PATENT-4 486 179 514,956

DENTAL SERVICES
Case Management and Prepaid Capitation as a Cost-Effective and Improved Method of Delivery of Dental Services: Massachusetts Dental Project.
PB85-146116/GAR 514,595

DEPLETED URANIUM
Prototype Firing Range Air Cleaning System.
DE85000360/GAR 515,176

DEPOSITION
Liquid Phase Products and Solid Deposit Formation from Thermally Stressed Model Jet Fuels.
N85-13066/4/GAR 515,668

DESIGN FLOOD
Review of British Flood Forecasting Practice,
PB85-140515/GAR 514,754

DESULFURIZATION
Hydrodesulfurization by Reduced Molybdenum Sulfides: Activity and Selectivity of Chevrel Phase Catalysts.
DE85002613/GAR 514,698

DETONATIONS
Transition to Detonation from Rapid-Compression (Ramp-Waves) Generated in a Burning Porous Bed,
AD-P004 345/5/GAR 515,700

Thermal-Mechanical Model of Deflagration-to-Detonation in Granular Energetic Materials,
AD-P004 346/3/GAR 515,593

Summary of the Mechanism of Delayed Detonation,
AD-P004 347/1/GAR 515,508

DETONATORS
CP DDT Detonators. II. Output Characterization.
DE84017251/GAR 515,497

DEUTERIUM
Low-Energy Nuclear Reactions with Hydrogen Isotopes.
DE85002388/GAR 515,564

DEVELOPING COUNTRIES
Important for the Future. Volume VI, Nos. 2-3. Special Issue on the Conference on Small Energy Resources.
DE85001848/GAR 514,906

Private Sector: Ideas and Opportunities. A Review of Basic Concepts and Selected Experience,
PB85-136331/GAR 514,464

Private Sector, the Public Sector, and Donor Assistance in Economic Development: An Interpretive Essay.
PB85-140093/GAR 514,469

Tendencias Recentes na Metodologia de Levantamentos Demograficos em Paises em Desenvolvimento (Recent Methodological Trends in Demographic Investigation in Developing Countries),
PB85-140119/GAR 514,551

Food Aid and Development: The Impact and Effectiveness of Bilateral PL 480 Title 1-Type Assistance.
PB85-140572/GAR 514,553

Planning Familial: Son Effet sur la Sante de la Femme et de l'Enfant (Family Planning: Its Effect on the Health of the Woman and Child),
PB85-141729/GAR 514,589

Simple Assessment Techniques for Soil and Water,
PB85-142669/GAR 514,781

Housing and Health: An Analysis for Use in the Planning, Design, and Evaluation of Low-Income Housing Programs.
PB85-143063/GAR 514,556

Production, Storage and Feeding of Herbaceous Forages to Support Ruminant Livestock in Developing Countries of the Tropics and Subtropics.
PB85-143089/GAR 514,374

Financial Leverage Potential of Local Currency Proceeds Generated from the Food for Peace Program to Stimulate Private Enterprise in Developing Countries,
PB85-143097/GAR 514,481

International Transfer and Acquisition of Technology: Documentary Review,
PB85-147791/GAR 514,491

DEVELOPING COUNTRY APPLICATION
Manual for Building Temporary Emergency Shelters (Manual para la Construccion de Abrigos de Emergencia Temporales) (Manuel pour la Construction des Abris D'Urgence Temporaires) (Kitab li bina Ma'Wa Muwaqat fil Halat at Tawara),
PB85-143808/GAR 515,123

DEVELOPING NATIONS
Toward a Theory of Military Involvement in National Development in Underdeveloped Countries.
AD-A148 998/8/GAR 514,497

DIAGNOSTIC EQUIPMENT
AFOSR(Air Force Office of Scientific Research) Research Meeting on Diagnostics of Reacting Flow Held at New Haven, Connecticut on 21-22 March 1984.
AD-A149 023/4/GAR 515,592

DIAGNOSTIC TECHNIQUES
Laser-Based Diagnostics for Coal Gasification Instrumentation.
DE85002385/GAR 515,652

DIALLATE
Guidance for the Reregistration of Manufacturing-Use and Certain End-Use Pesticide Products Containing Diallate.
PB85-144814/GAR 514,368

DIARRHEA
Arab Republic of Egypt Nutrition Status Survey II, 1980.
PB85-144632/GAR 514,592

DIATOMIC MOLECULES
Vibrational Excitation, Harpooning, and Sticking in Molecule-Surface Collisions.
PB85-151603 514,719

DIAZEPAM
Blood Substitutes: Effects on Drug Pharmacokinetics.
AD-A148 926/5/GAR 514,639

DIELECTRIC PROPERTIES
Advanced Artificial Dielectric Materials for Millimeter Wavelength Applications.
AD-A148 960/8/GAR 514,970

Electrostriction and Dielectric Friction on Ions Moving through Compressible Polar Solvents.
PB85-151702 514,720

DIELECTRIC TRACK DETECTORS
Interactive and Automated Systems for Nuclear Track Measurements with Applications to Fast Neutron Dosimetry.
DE85002240/GAR 515,353

DIELECTRICS
Advanced Artificial Dielectric Materials for Millimeter Wavelength Applications.
AD-A148 960/8/GAR 514,970

Process of Synthesizing Mixed BaO-TiO2 Based Powders for Ceramic Applications.
PAT-APPL-6-571 539/GAR 514,963

DIESEL ENGINE EXHAUST
Theoretical Study of the Optical Properties of Diesel Particles.
PB85-144368/GAR 514,715

DIESEL ENGINES
Methanol Engine Conversion Feasibility Study: Phase 1.
DE85000994/GAR 515,691

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N85-13075/5/GAR 514,448

Advanced Automotive Diesel Assessment Program.
N85-13235/5/GAR 515,693

Overview of Waste Heat Utilization Systems.
N85-13692/7/GAR 514,922

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DE85001825/GAR 515,631

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Energy Data Report: Prices and Margins of No. 2 Distillate Fuel Oil. Monthly Report, January 1982.
DE85002328/GAR 515,649

DIFFERENTIAL EQUATIONS
Interval Mathematics Reports.
N85-13536/6/GAR 515,042

DIFFRACTION DIFFUSION SCREENS
Diffraction Diffusion Screen with Holographically-Suppressed Zero-Order Beam.
PAT-APPL-6-667 194/GAR 515,551

DIFFUSERS
Diffraction Diffusion Screen with Holographically-Suppressed Zero-Order Beam.
PAT-APPL-6-667 194/GAR 515,551

DIFFUSION
Fundamental Studies on MPD(Magneto Plasma Dynamics) Thrusters.
AD-A149 074/7/GAR 515,600

DIFFUSION FLAMES
Experimental Study of Turbulent Jet Diffusion Flames (Revised Version).
PB85-140929/GAR 515,599

DIGITAL COMPUTERS
Interim Criteria for the Use of Programmable Digital Devices in Safety and Control Systems.
NUREG/CR-4017/GAR 515,458

DIGITAL SYSTEMS
Transdigitizer for Relaying Signals from Global Positioning System (GPS) Satellites.
PAT-APPL-6-666 784/GAR 515,305

DIGTONINS
Saponin-Based Polyether Polyols.
PAT-APPL-6-548 849/GAR 514,643

DIP COATING
Protective Coatings: Immersion Plating. 1966-February 1985 (Citations from the Metals Abstracts Data Base).
PB85-854842/GAR 514,968

DIRECT GAIN SYSTEMS
Short Duration Winter-Time Performances of Different Passive Solar Systems.
DE85000650/GAR 515,067

DIRECTORIES
Directory of Scientific Research, 1984.
PB85-139648/GAR *514,453*

DISABILITIES
Physician Evaluation of Impairment/Disability.
HRP-0906093/0/GAR *514,619*

DISEASES
Reports on AIDS (Acquired Immunodeficiency Syndrome) Published in the Morbidity and Mortality Weekly Report, June 1981 through January 1985.
PB85-162139/GAR *514,599*

DISLOCATED WORKERS
Process and Implementation Issues in the Design and Conduct of Programs to Aid the Reemployment of Dislocated Workers,
PB85-146702/GAR *514,539*

DISPERSION RELATIONS
Improved Magnetic Bias and Delay Linearity in a Magnetostatic Wave Delay Line.
PAT-APPL-6-664 193/GAR *514,795*

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AD-A148 916/0 *514,807*

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AD-A148 926/9 *514,808*

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AD-A149 065/5/GAR *514,816*

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AD-A149 021/8/GAR *514,427*

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DE85002172/GAR *515,267*

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Women in Development.
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Stress Intensity Factors for Corner Cracks at Holes Located Near an Edge.
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ELASTIC PROPERTIES
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Two Photoelectrode Solid-State Photoelectrochemical Cell.
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Orientation of Hydroquinone and Benzoquinone Adsorbed on Platinum Electrodes: Studies by Reflection-Adsorption Infrared Spectroscopy.
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ELECTRODES
Two Photoelectrode Solid-State Photoelectrochemical Cell.
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ELECTRON PHONON INTERACTIONS
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AD-A148 933/5/GAR 515,584

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Ion Thruster Performance Model.
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ELECTROSTATIC PROPULSION
Ion Thruster Performance Model.
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ENERGY POLICY
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DE84770470/GAR *514,884*

Progress in Energy, 1983-1984.
DE85002818/GAR *514,914*

ENERGY SOURCE DEVELOPMENT
Achieving Aggressive Mitigation Through State Regulation: A Case of the Wyoming Industrial Development Information and Siting Act.
DE85000067/GAR *514,894*

Modeling Tax Credit Incentives for Business Investment in Selected Energy Conservation and Production Technologies.
DE85003168/GAR *514,918*

ENERGY SOURCES
Important for the Future. Volume VI, Nos. 2-3. Special Issue on the Conference on Small Energy Resources.
DE85001846/GAR *514,906*

ENERGY STORAGE
Regenerative Fuel Cell Energy Storage System for a Low Earth Orbit Space Station.
N85-13371/8/GAR *514,945*

ENERGY SUPPLIES
Progress Report for the Period 1st January Until 31st December 1983.
DE84770514/GAR *514,892*

Short-Term Energy Outlook. Quarterly Projections, October 1984.
DE85003134/GAR *514,916*

ENERGY SYSTEMS
Energy-Related Risk in the United States in the Year 2020.
DE84017213/GAR *514,881*

ENERGY TRANSFER
Energieuebertraege bei Atom-Molekuel-Streuexperimenten AM Beispiel der Systeme SF6-AR, CF4-Ne und Xe-CO2 im I 1 Ev-Bereich (Energy Transfer in Atom-Molecule Scattering Experiments in the 1EV Region with SF6-AR, CF4-Ne and Xe-CO2 Systems as Examples).
N85-13588/7/GAR *514,708*

ENERGY TRANSPORT
Coal and Gas Pipeline Feasibility Study. Volume II. Technical and Economic Evaluation.
FE-2707-T1(V.2)/GAR *514,767*

ENGINE DESIGN
Stirling Material Technology.
N85-13007/8/GAR *515,692*

Advanced Automotive Diesel Assessment Program.
N85-13235/5/GAR *515,693*

ENGINE INLETS
Extrapolation of Engine Inlet Measurements According to Tsukahira,
PB85-143212/GAR *515,690*

ENGINE NOISE
Experimental Investigation of Shock-Cell Noise Reduction for Dual-Stream Nozzles in Simulated Flight.
N85-13549/9/GAR *515,687*

Static Jet Noise Test Results of Four 0.35 Scale-Model QCGAT(Quiet Clean General Aviation Turbofan) Mixer Nozzles.
N85-13551/5/GAR *515,689*

ENGINE PARTS
Bulletin of the Faculty of Engineering, Hokkaido University, No. 123.
N85-13075/5/GAR *514,446*

ENGINEERING
Engineering Research Progress Report, October 1983-March 1984.
DE85000165/GAR *515,086*

ENHANCED RECOVERY
Oil Field Data and Industry Opinions Important to the Commercialization of Solar Thermal Enhanced Oil Recovery.
DE85002153/GAR *514,760*

Investment Evaluation of Solar Thermal Enhanced Oil Recovery (STEOR) Systems for Project Starts in the Years 1982 and 1986.
DE85002164/GAR *514,762*

Technical Support Services for the Solar Thermal Enhanced Oil Recovery Program. Volume 1. Program Summary Report, February 9-May 31, 1981.
DE85002165/GAR *514,763*

Energy Production Research. Volume I. Quarterly Technical Report, April 1-June 30, 1984.
DE85002180/GAR *514,764*

ENTRAINMENT
Partikelmitfuehrung in Einem Kompressiblen Wirbel (Particle Entrainment in a Compressible Vortex).
N85-13192/8/GAR *515,532*

ENVIRONMENT
Sourcebook: Gaining Access to US Government Information on the Environment and Natural Resources.
DE84017419/GAR *514,442*

ENVIRONMENT EFFECTS
Ocean Services User Needs Assessment. Volume 1. Survey Results, Conclusions and Recommendations.
N85-13445/0/GAR *514,447*

ENVIRONMENTAL IMPACT STATEMENTS-FINAL
Final Environmental Statement Related to the Operation of Millstone Nuclear Power Station, Unit No. 3, Docket No. 50-423, Northeast Nuclear Energy Company, et al.
NUREG-1064/GAR *515,371*

ENVIRONMENTAL IMPACTS
Water Pollution: Uptake of Heavy Metals by Shellfish and Marine Plants. 1974-February 1985 (Citations from Oceanic Abstracts).
PB85-855237/GAR *514,603*

ENVIRONMENTAL SURVEYS
Coal Tar Hazards. 1976-February 1985 (Citations from the Energy Data Base).
PB85-855302/GAR *514,621*

ENVIRONMENTAL SURVEYS
Primer of Occupational and Environmental Medicine: A Manual for Family Physicians and Other Primary Care Physicians,
HRP-0906070/8/GAR *514,616*

Asbestos: Expedience, Exposure, and Human Experience,
HRP-0906074/0/GAR *514,617*

Hazards to Women in the Workplace,
HRP-0906079/9/GAR *514,618*

Environmental Aspects of Transportation,
PB85-145134/GAR *515,111*

Odor Pollution. 1977-February 1985 (Citations from the NTIS Data Base).
PB85-854941/GAR *515,116*

Energy and the Environment: A Current Awareness Journal.
PB85-914900/GAR *515,118*

KEYWORD INDEX

EPITAXIAL GROWTH
Metal-Semiconductor Field-Effect Transistors Fabricated in GaAs Layers Grown Directly on Si Substrates by Molecular Beam Epitaxy.
AD-A149 001/0/GAR *514,782*

EPOXY MATRIX COMPOSITES
Tough Composite Materials.
N85-12941/9/GAR *514,973*

EPOXY RESINS
Toughening Mechanism in Elastomer-Modified Epoxy Resins, Part 2.
N85-13046/6/GAR *515,018*

EQUATIONS OF STATE
Experimentelle Zustandsgleichung fuer Bosonenga (Experimental Equations of State for Boson Gases).
N85-13659/6/GAR *515,586*

EQUIPMENT
General Engineering Specifications for 6000 Tpd SRC-I Demonstration Plant.
DE85000033/GAR *515,611*

General Engineering Specifications for 6000 Tpd SRC-I Demonstration Plant.
DE85000794/GAR *515,621*

DOD (Department of Defense) Manufacturing Technology Program--Management is Improving but Benefits Hard to Measure.
PB85-144186/GAR *515,264*

EROSION
Fundamental Studies on MPD(Magneto Plasma Dynamics) Thrusters.
AD-A149 074/7/GAR *515,600*

Evaluation of Chemical Stabilizers and Windscreens for Wind Erosion Control of Uranium Mill Tailings.
DE85000828/GAR *515,396*

High-Temperature Erosion of Plasma-Sprayed, Yttria-Stabilized Zirconia in a Simulated Turbine Environment.
N85-13045/8/GAR *514,961*

EROSION CONTROL
Soil Improvement, Rainfall Conservation, and Erosion Control in Developing Countries.
PB85-143717/GAR *514,366*

EROSION RESISTANCE
Evaluation of Titanium Diboride Gun Tube Coatings.
AD-A148 901/2/GAR *515,511*

ERROR DETECTION CODES
Undetected Error Probability for Shortened Hamming Codes.
N85-13535/8/GAR *514,860*

ERYTHROCYTES
Effect of Inert Gases on Ion Transport Across the Erythrocyte Membrane.
AD-A148 889/9/GAR *514,844*

ETCHING
Reactive Ion Etching and Reactive Sputter Etching, 1976-February 1985 (Citations from the INSPEC: Information Services for the Physics and Engineering Communities Data Base).
PB85-855047/GAR *515,160*

ETHANOL
Experimental and Theoretical Study of Condensation in Multicomponent Vapors. Quarterly Report No. 1 for 15 February-14 May 1984.
DE85000857/GAR *514,696*

ETHICS
Ethics and the Army Officer: An Assessment and Recommendations for the Future.
AD-A148 949/1/GAR *514,517*

ETHNIC GROUPS
Private Sector: Ethnicity, Individual Initiative, and Economic Growth in an African Plural Society. The Bamileke of Cameroon.
PB85-140192/GAR *514,552*

ETHYL ALCOHOL
Bulletin of the Faculty of Engineering, Hokkaido University, No. 123.
N85-13075/5/GAR *514,446*

Ethanol from Sugar Crops: A Critical Review,
PB85-140176/GAR *515,671*

ETHYLENE
Plasticity, Agglomeration and Volatiles Secondary Reactions in Coal Pyrolysis. Annual Report, September 10, 1982-February 29, 1984.
DE85002492/GAR *515,655*

Thermodynamic Properties of Ethylene at Saturation.
PB85-151777 *514,722*

EULER BUCKLING
Deformations Non-Lineaires et Flambage Statique Lineaire de Structures Soumises a des Forces de Pression (Nonlinear Deformation and Static Linear Bucking of Structures under Pressure).
N85-13281/9/GAR *515,581*

EULER EQUATIONS OF MOTION
Model Equations Describing Unsteady Fluid Motion.
N85-13194/4/GAR *515,533*

EUROPEAN SPACE AGENCY
ESA(European Space Agency) Product Assurance Specification System: Explanatory Note.
N85-13259/5/GAR *515,720*

EUROPEAN SPACE PROGRAMS
Colloquium About Joint Projects within DFVLR/ISRO(Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt/Indian Space Research Organization, Bangalore, Satellite Centre) Cooperation.
N85-12907/0/GAR *515,703*

Systeme de Telecommunications Par Satellite Telecom 1 (The Telecom 1 Satellite Telecommunication System).
N85-13147/2/GAR *515,286*

EVOLUTION 3 FABRIC
Comparison of Nomex and Evolution 3 for Use in Tent Liners.
AD-A149 057/2/GAR *514,984*

EXCAVATION
Development of Soft Excavation Techniques, Phases 2 and 2A.
PB85-152817/GAR *515,124*

EXERCISE (PHYSIOLOGY)
Skeletal Muscle Metabolism during Exercise is Influenced by Heat Acclimation.
AD-A148 845/1/GAR *514,658*

Food Deprivation and Exercise in the Heat: Thermoregulatory and Metabolic Effects,
AD-A148 847/7/GAR *514,660*

EXHAUST EMISSIONS
Theoretical Study of the Optical Properties of Diesel Particles.
PB85-144368/GAR *514,715*

Environmental Aspects of Transportation,
PB85-145134/GAR *515,111*

EXHAUST GASES
Overview of Waste Heat Utilization Systems.
N85-13692/7/GAR *514,922*

EXHAUST NOZZLES
Preliminary Checkout, Evaluation and Calibration of a 3-Component Force Measurement System for Calibrating Propulsion Simulators for Wind Tunnel Models.
N85-12903/9/GAR *515,220*

Static Jet Noise Test Results of Four 0.35 Scale-Model QCGAT(Quiet Clean General Aviation Turbofan) Mixer Nozzles.
N85-13551/5/GAR *515,689*

EXOBIOLOGY
Aerospace Medicine and Biology, a Continuing Bibliography with Indexes.
N85-13467/4/GAR *514,585*

EXPERT SYSTEMS
Combat Battle Damage Assessor Expert System,
AD-A148 898/0/GAR *515,268*

Expert Computer Systems. February 1984-January 1985 (Citations from the INSPEC: Information Services for the Physics and Engineering Communities Data Base).
PB85-855401/GAR *514,847*

EXPLOSIONS
Structures to Resist the Effects of Accidental Explosions. Volume 3. Principles of Dynamic Analysis.
AD-A148 895/6/GAR *515,190*

Preventing Explosive Propagation in Racks or Containers of Tactical Missiles,
AD-P004 342/2/GAR *515,275*

Piezoelectric Stress Transducer Used for Measurements of Explosions in Hard Rock.
DE85000300/GAR *515,509*

Bulletin of the Faculty of Engineering, Hokkaido University, No. 123.
N85-13075/5/GAR *514,446*

EXPLOSIVES
NATO AC/310 Activities Report on NATO STANAG 4170 and Allied Ordnance Publication 7, AOP-7 (Manual of Tests for Qualification of Explosive Materials for Military Use).
AD-P004 341/4/GAR *515,494*

Thermal-Mechanical Model of Deflagration-to-Detonation in Granular Energetic Materials,
AD-P004 346/3/GAR *515,593*

Some Aspects of the Micromechanics of Hot Spot Formation in Energetic Materials,
AD-P004 348/9/GAR *515,495*

Official Journey to USA, November 1983. Symposium on the Compatibility of Explosives; Mound Laboratory; Naval Surface Weapons Center.
N85-13072/2/GAR *515,500*

Laser for Determining the Ignition Conditions of a Pyrotechnic Mixture.
N85-13230/6/GAR *515,598*

Etude, par la Methode de Coin, de la Composition B2141 (SNPE): Correlation entre l'Amorcabilite et la Formulation d'un Explosif a Liant Plastique (Wedge-Technique Investigation of Composite Explosive B2141 (SNPE), Correlation between Ignitability and Formation of an Explosive with Plastic Bond),
PB85-141596/GAR *515,502*

EXPORTS
Private Sector: Regulation of Rural Markets in Africa.
PB85-140150/GAR *514,349*

EXTERNAL COMBUSTION ENGINES
Stirling Material Technology.
N85-13007/8/GAR *515,692*

EXTRACTION
Saponin-Based Polyether Polyols.
PAT-APPL-6-548 849/GAR *514,643*

EXTRAVEHICULAR ACTIVITY
Human Role in Space. Volume 1. Executive Summary.
N85-13473/2/GAR *515,709*

FA/C (FUNCTIONAL ACCURATE COOPERATIVE)
Functionally Accurate, Cooperative Distributed Systems.
AD-A148 926/9 *514,808*

FABRICATION
Design, Fabrication and Delivery of a Spacelab Neutral Buoyancy Instrument Pointing System (IPS) Mockup.
N85-12934/4/GAR *514,532*

FACSIMILE COMMUNICATION
Apollo System Requirements Specification.
N85-13150/6/GAR *515,269*

FAMILY PHYSICIANS
Primer of Occupational and Environmental Medicine: A Manual for Family Physicians and Other Primary Care Physicians,
HRP-0906070/8/GAR *514,616*

FAMILY PLANNING
Improving Infant Nutrition, Health and Survival: Policy and Program Implications from the Malaysian Family Life Survey,
PB85-141653/GAR *514,607*

Planning Familial: Son Effet sur la Sante de la Femme et de l'Enfant (Family Planning: Its Effect on the Health of the Woman and Child),
PB85-141729/GAR *514,589*

Comparative Studies. Cross National Summaries Number 14: Family Size Preferences,
PB85-141828/GAR *514,554*

Birthspacing, Fertility, and Family Planning: Policy and Program Implications from the Malaysian Family Life Survey,
PB85-143774/GAR *514,558*

Contraception: A Guide to Birth Planning Methods,
PB85-145670/GAR *514,593*

FAMILY PRACTIONERS
Physician Evaluation of Impairment/Disability.
HRP-0906093/0/GAR *514,619*

FARM CROPS
Direct Combustion Systems to Produce Power from Biomass from Wood, Forest and Agricultural Crop Residue,
PB85-137800/GAR *515,670*

Private Sector: Regulation of Rural Markets in Africa.
PB85-140150/GAR *514,349*

Agricultural Research System of Pakistan: The Report of the Minnesota Reconnaissance Team,
PB85-141836/GAR *514,372*

Pigeonpeas (Cajanus cajan Millisp.): A Valuable Crop of the Tropics,
PB85-143105/GAR *514,375*

FARM WORKERS
Social Methodology for Community Participation in Local Investments: The Experience of Mexico's PIDER (Integrated Program for Rural Development) Program.
PB85-141604/GAR *514,475*

Metodologia Social para la Participacion Comunitaria en las Inversiones Locales: La Experiencia del PIDER (Programa de Inversiones para el Desarrollo Rural) en Mexico (Social Methodology for Community Participation in Local Investments: The Experience of Mexico's PIDER Program).
PB85-141612/GAR *514,476*

FARMS
Landless Workers and Rice Farmers: Peasant Subclasses Under Agrarian Reform in Two Philippine Villages,
PB85-142644/GAR *514,351*

FATIGUE LIFE
Effect of Lubricant Extreme-Pressure Additives on Surface Fatigue Life of AISI 9310 Spur Gears.
N85-13234/8/GAR *515,166*

FATIGUE (MATERIALS)
Composite Structural Materials.
N85-12968/6/GAR *514,974*

Interaction Fatigue - Fluage dans les Composites Carbone/Resine + or - 45 degrees (Interaction Fatigue - Creep in Carbon/Resin Compounds + or - 45 degrees),
PB85-141588/GAR *514,982*

Perfectionnement des Lois de Fissuration par Fatigue sous Chargement Complexe (Perfecting the Fatigue Cracking Laws under Complex Loads),
PB85-145068/GAR *515,006*

FAULT DETECTION
Design of a Knowledge-Based Fault Detection and Diagnosis System,
AD-A148 859/2/GAR *514,422*

Meta-Level Control through Fault Detection and Diagnosis,
AD-A149 064/8/GAR *514,815*

FAULT TOLERANCE
Technologies for Space Station Autonomy.
N85-12908/2/GAR *515,713*

Analysis of the Impact of Error Detection on Computer Performance.
N85-13477/3/GAR 514,824

FAULT TOLERANT COMPUTING
Test Experience on an Ultrareliable Computer Communication Network.
N85-13514/3/GAR 514,827

FAULT TREE ANALYSIS
Calculation through Fault Tree Analysis of the Probability of a Warhead Being Armed Prior to Launch,
AD-P004 339/8/GAR 515,274

FBR TYPE REACTORS
Universal Fast Breeder Reactor Subassembly Counter Manual.
DE85001523/GAR 515,349

FEDERAL AGENCIES
Determining the Need for Training: A Collection of Federal Agency Needs Assessment Practices,
PB85-144806/GAR 514,538

Analyze and Make Recommendations on Information and Assistance Needs and Resources from the Perspective of the Medicaid Agencies.
PB85-145829/GAR 514,561

FEDERAL CREDIT PROGRAMS
Federal Credit Programs for Agriculture: Background for 1985 Farm Legislation.
PB85-138923/GAR 514,348

FEDERAL INFORMATION PROCESSING STANDARDS
Metropolitan Statistical Areas (Including CMSAs (Consolidated Metropolitan Statistical Areas), PMSAs (Primary Metropolitan Statistical Areas), and NECMAs (New England County Metropolitan Areas)). Category: Data Standards and Guidelines. Subcategory: Representations and Codes.
FIPS PUB 8-5/GAR 514,820

FEDERAL REPUBLIC OF GERMANY
Progress Report for the Period 1st January Until 31st December 1983.
DE84770514/GAR 514,892

FEEDING
Field Feeding System to Support USMC Forces in the 1990s.
AD-A148 953/3/GAR 514,606

FEMALES
Hazards to Women in the Workplace,
HRP-0906079/9/GAR 514,618

Women in Development.
PB85-136661/GAR 514,549

Children and Women in Traditional and Cash Crop Agriculture: A Preliminary Cross-Section Study of Economic Development in Guatemala,
PB85-143709/GAR 514,355

Social Roles and the Health of American Women.
PB85-147452/GAR 514,620

FERMI SURFACES
High Resolution Electron Energy Loss Studies of Fermi-Level States of Clean and Metallized Si(111) Surfaces.
AD-A148 933/5/GAR 515,584

FERMIONS
Derivative Expansions of Fermion Determinants: Anomaly-Induced Vertices, Goldstone-Wilczek Currents, and Skyrme Terms,
PB85-139756/GAR 515,566

FERTILITY
Sudan Fertility Survey, 1979: A Summary of Findings.
PB85-138030/GAR 514,550

Comparative Studies. Cross National Summaries Number 14: Family Size Preferences,
PB85-141828/GAR 514,554

Evaluation of Birth Histories: A Case Study of Kenya.
PB85-141844/GAR 514,555

Birthspacing, Fertility, and Family Planning: Policy and Program Implications from the Malaysian Family Life Survey,
PB85-143774/GAR 514,558

FERTILIZERS
Soil Improvement, Rainfall Conservation, and Erosion Control in Developing Countries.
PB85-143717/GAR 514,366

Energy and Fertilizer: Policy Implications and Options for Developing Countries.
PB85-144301/GAR 514,367

FFTF REACTOR
FFTF Fuel Assembly Outlet Temperature Measurements and Comparison to Predictions.
DE85001215/GAR 515,440

FIBER COMPOSITES
Tough Composite Materials.
N85-12941/9/GAR 514,973

New Theoretical Approach to the Strength of Fibre Composite Hybrid Materials,
PB85-137743/GAR 514,980

Interaction Fatigue - Fluage dans les Composites Carbone/Resine + or - 45 degrees (Interaction Fatigue - Creep in Carbon/Resin Compounds + or - 45 degrees),
PB85-141588/GAR 514,982

FIBER OPTICS
Development of a Prototype Flat Winding Machine for Winding Air Deployed Fiberoptic Cable.
AD-A149 038/2/GAR 515,164

High-Temperature Optically Activated GaAs Power Switching for Aircraft Digital Electronic Control.
N85-12901/3/GAR 514,337

Fiber Optic Data Bus Using Frequency Division Multiplexing (FDM) (Frequency Division Multiplexing) and an Asymmetric Coupler.
N85-13139/9/GAR 515,284

Analysis of Single-Mode Evanescent-Field-Pumped Dye Amplifier,
PB85-143238/GAR 515,547

Coupleur Semi Passif Integre pour Reseau a Fibres Optiques (Integrated Semi-Passive Coupler for Optical Fiber System),
PB85-144699/GAR 515,552

FIBER REINFORCED COMPOSITES
Composite Structural Materials.
N85-12966/6/GAR 514,974

FIBERGLASS REINFORCED PLASTICS
Prediction of Long Term Strength of Glass Reinforced Plastics in Wet Environments,
PB85-138360/GAR 514,981

FIBERS
Gel Drawn Fibers of Poly(Vinyl Alcohol).
AD-A149 062/2/GAR 515,010

FIELD EFFECT TRANSISTORS
Metal-Semiconductor Field-Effect Transistors Fabricated in GaAs Layers Grown Directly on Si Substrates by Molecular Beam Epitaxy.
AD-A149 001/0/GAR 514,782

High-Temperature Optically Activated GaAs Power Switching for Aircraft Digital Electronic Control.
N85-12901/3/GAR 514,337

Power MOSFETS. 1977-February 1985 (Citations from the INSPEC: Information Services for the Physics and Engineering Communities Data Base).
PB85-855096/GAR 514,798

FIELD ION MICROSCOPY
Approach to Realism in Field Ion Microscopy via Zone Electropolishing.
PB85-151579 515,249

FIELD STRENGTH
Field Strength Levels in Vehicles Resulting from Communications Transmitters.
PB85-144830 515,293

FILES (RECORDS)
Pilot of the Modern Army Record-Keeping System (MARKS) at 5th Battalion, 73rd Armored Regiment, 194th Armored Brigade, Fort Knox, Kentucky.
AD-A148 974/9/GAR 514,519

FILTRATION
Feasibility Study of Alternative Technology for Small Community Water Supply.
PB85-143287/GAR 515,102

FINITE DIFFERENCE THEORY
Vectorization and Implementation of an Efficient Multigrid Algorithm for the Solution of Elliptic Partial Differential Equations.
AD-A149 049/9/GAR 515,029

FINITE ELEMENT ANALYSIS
Program Design for an Adaptive, Non-Linear Finite Element Solver.
AD-A148 880/8/GAR 514,802

Finite Element Analysis of Nonlinear Oscillations and Flutter of Shells of Revolution.
AD-A149 071/3/GAR 515,577

FINS
Oil-Flow Study of a Space Shuttle Orbiter Tip-Fin Controller.
N85-12920/3/GAR 515,714

FIRE RESISTANT TEXTILES
Comparison of Nomex and Evolution 3 for Use in Tent Liners.
AD-A149 057/2/GAR 514,984

FIRE SUPPORT
Fire Support Team Vehicle (FIST-V) System: An Analysis of Human Factors, Training, Safety and Related Considerations.
AD-A149 070/5/GAR 515,504

FIRES
National Fire Incident Reporting System (NFIRS) Data Base (1983 Equipment/Casualty File).
PB85-132207/GAR 515,184

National Fire Incident Reporting System (NFIRS) Data Base (1983 Master File).
PB85-132215/GAR 515,185

National Fire Incident Reporting Systems (NFIRS) Data Base (1983 Incident File).
PB85-132231/GAR 515,186

FIRMWARE
Firmware: Design Techniques and Applications. 1975-February 1985 (Citations from the INSPEC: Information Services for the Physics and Engineering Communities Data Base).
PB85-855377/GAR 514,846

FIRST WALL
First-Wall and Limiter Conditioning in TFTR.
DE85002714/GAR 515,336

FISCHER-TROPSCH SYNTHESIS
CO+ H Sub 2 Reaction over Nitrogen-Modified Iron Catalysts. Quarterly Technical Progress Report, April 1, 1984-June 30, 1984.
DE85000025/GAR 515,607

Chemistry and Morphology of Coal Liquefaction. Annual Report, October 1, 1983-September 30, 1984.
DE85003056/GAR 515,666

FISHERIES
Mauritania: Rural Assessment and Manpower Surveys. Inland Fisheries.
PB85-144558/GAR 514,575

Mauritania: Rural Assessment and Manpower Surveys. Traditional Maritime Fisheries.
PB85-144580/GAR 514,576

FISHES
Guidelines for Predicting the Effects of Underwater Explosions on Swimbladder Fish.
AD-A148 870/9/GAR 515,505

FISSION PRODUCT RELEASE
Steady-State and Transient Fission Gas Release and Swelling Model for LIFE-4.
DE84014730/GAR 515,421

Particulate and Gas Release from Light-Water-Reactor (LWR) Fuel Rods Stored in Inert and Dry Air Atmospheres.
NUREG/CR-4056/GAR 515,420

FLAGS
U.S.-Flag Crosstrading. Volume 1. Executive Summary.
PB85-146553/GAR 514,488

U.S.-Flag Crosstrading. Volume 2. U.S.-Flag Crosstrading Operations and U.S. Policy Options.
PB85-146561/GAR 514,489

U.S.-Flag Crosstrading. Volume 3. Impediments to U.S.-Flag Crosstrading Operations.
PB85-146579/GAR 514,490

FLAME PROPAGATION
Hydrogen Flame Acceleration and Transition to Detonation.
DE85000611/GAR 515,378

Research in Nonlinear Problems of Energy. Informal Technical Progress Report.
DE85001529/GAR 515,596

Combustion Waves in Dispersed-2-Phase Mixtures.
N85-13003/7/GAR 514,704

FLAME SPRAYING
Plasma and Flame Sprayed Coatings. 1980-February 1985 (Citations from the Engineering Index Data Base).
PB85-854982/GAR 514,969

FLAMES
Experimental Investigations on the Reaction Structure in Folded Pre-Mixed Flame Fronts.
DE84770495/GAR 515,594

Modifications to FURDEC (Furnace Heat Transfer Program) to Include Self-Consistent Flame Modelling.
PB85-143154/GAR 515,075

FLASHOVER
Flashover Failures from Wet-Wire Arcing and Tracking.
AD-A149 055/6/GAR 514,848

FLAT SURFACES
Local Stability Analysis for a Planar Shock Wave.
N85-12864/3/GAR 515,530

FLEXIBLE MANUFACTURING SYSTEMS
Flexible Manufacturing Systems. 1975-February 1984 (Citations from the INSPEC: Information Services for the Physics and Engineering Communities Data Base).
PB85-854867/GAR 514,841

Flexible Manufacturing Systems. March 1984-February 1985 (Citations from the INSPEC: Information Services for the Physics and Engineering Communities Data Base).
PB85-854875/GAR 515,159

FLIGHT CONTROL
Unified Method for Evaluating Real-Time Computer Controllers: A Case Study.
N85-13478/1/GAR 514,342

FLIGHT CREWS
System Status Display Information.
N85-12889/0/GAR 514,341

FLIGHT LOADS
Conference Proceedings of Operational Loads Data Held at Sienna, Italy on 2-6 April 1984,
AD-A149 025/9/GAR 514,329

FLIGHT TESTS
Flight and Wind-Tunnel Comparisons of the Inlet-Airframe Interaction of the F-15 Airplane.
N85-12884/1/GAR 514,334

Flight Tests of the Digital Integrated Automatic Landing System (Dials).
N85-12900/5/GAR 515,304

FLOOD FORECASTING
Review of British Flood Forecasting Practice,
PB85-140515/GAR 514,754

FLOODS
Fontes de Calor Nos Tropicos E Escoamentos Anoma Los de Larga Escala Associadas COM Anomalias de Pre-

ciplacao No Nordeste Do Brasil (Heat Sources in the Tropics and Large Scale Flow Anomalies Associated with Precipitation Anomalies in Northeast Brazil).
N85-13421/1/GAR 514,414

FLOORS
Full-Scale Crash-Test Evaluation of Two Load-Limiting Subfloors for General Aviation Airframes.
N85-13267/8/GAR 514,339

Structural Use of Chipboard for Flooring: State of the Art Report.
PB85-139855/GAR 515,122

FLOW
AFOSR(Air Force Office of Scientific Research) Research Meeting on Diagnostics of Reacting Flow Held at New Haven, Connecticut on 21-22 March 1984.
AD-A149 023/4/GAR 515,592

FLOW DISTRIBUTION
Study of Flow Past an Airfoil with a Jet Issuing from Its Lower Surface.
N85-12860/1/GAR 514,316

Viscous-Inviscid Aerodynamic Analysis of Two-Dimensional Thrust Augmentors.
N85-12861/9/GAR 514,317

Development of Computational Fluid Dynamics at NASA Ames Research Center.
N85-12866/8/GAR 514,320

Experimental Investigation of Two-Dimensional Thrust Augmenting Ejectors, Part 2.
N85-12865/7/GAR 515,685

Preliminary Checkout, Evaluation and Calibration of a 3-Component Force Measurement System for Calibrating Propulsion Simulators for Wind Tunnel Models.
N85-12903/9/GAR 515,220

Model Equations Describing Unsteady Fluid Motion.
N85-13184/4/GAR 515,539

Effect of Two Inner-Ring Oil-Flow Distribution Schemes on the Operating Characteristics of a 35 Millimeter Bore Ball Bearing to 2.5 Million Dn.
N85-13233/0/GAR 515,165

FLOW MEASUREMENT
Study of the Structure of Turbulent Shear Flows at Supersonic Speeds and High Reynolds Number.
N85-12865/0/GAR 515,531

Magnetic Inductive Flowmeter for Low Conducting Liquids.
N85-13216/5/GAR 515,225

Possibilites d'Application de l'Anemometrie Laser a l'Etude de l'Interaction Cho/Couche Limite en Transsonique (Possibilities of Applying Laser Anemometry to an Investigation of the Interaction Shock/Boundary Layer in Transonic Flight).
PB86-144533/GAR 514,327

FLOW RATE
Capabilities of Laser Diagnostics for Combustion and Flowfields.
DE85002661/GAR 515,209

FLOW THEORY
Magnetohydrodynamic and Gasdynamic Theories for Planetary Bow Waves.
N85-13760/2/GAR 514,399

FLOW VISUALIZATION
Capabilities of Laser Diagnostics for Combustion and Flowfields.
DE85002661/GAR 515,209

Role of Freestream Turbulence Scale in Subsonic Flow Separation.
N85-12870/0/GAR 514,322

FLOWMETERS
Magnetic Inductive Flowmeter for Low Conducting Liquids.
N85-13216/5/GAR 515,225

Energy Flowmeter Development, Phases 1 and 2.
PB85-149748/GAR 514,925

FLUE GAS
Project on Sulfur Dioxide Removal and Waste Products Utilization Process. Final Report.
DE84017333/GAR 515,084

Industrial Exhaust-Air Purification Employing the Process of Adsorption to Activated Carbon.
DE84770477/GAR 515,085

FLUE GASES
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PB85-854925/GAR 515,115

FLUID FLOW
Perturbation of a Multiple Eigenvalue in the Benard Problem for Two Fluid Layers.
AD-A149 068/9/GAR 515,529

Analysis of Physical-Chemical Processes Governing SSME Internal Fluid Flows.
N85-12859/3/GAR 515,696

FLUID-STRUCTURE INTERACTIONS
Theoretical and Experimental Investigations on the Fluid-Structure-Interactions in an Oscillation Model of a Pressurized Water Reactor.
DE84770496/GAR 515,435

FLUIDIZED-BED COMBUSTION
20-Atmosphere Rig PFBC Results: Test 20. Investigations with a Medium-Volatile Content Coal.
DE84012002/GAR 515,083

FLUIDIZED-BED COMBUSTORS
20-Atmosphere Rig PFBC Results: Tests 18 and 19. Further Investigation into Agglomerate Formation when Using Limestone as the Sorbent.
DE84012001/GAR 515,061

FLUIDIZED BED PROCESSING
Particulate Emissions and Control in Fluidized-Bed Combustion: Modeling and Parametric Performance.
PB85-152973/GAR 515,114

FLUIDIZED BED PROCESSORS
Design Report on the Atmospheric Fluidized Bed Combustor at the Kentucky Center for Energy Research Laboratory.
PB85-138915/GAR 515,092

FLUIDS
Asymptotic Density Correlations and Corrections to Scaling for Fluids with Non-Finite-Range Interactions.
PB85-151645 515,542

Application of the Extended Corresponding States Model to Hydrocarbon Mixtures (Computer Program EXCST).
PB85-151744 514,721

Semi-Automated Facilities for Measuring Density, PVT and VLE of Energy-Related Fluids.
PB85-151785 514,723

Universal Representation of the Thermodynamic Properties of Fluids in the Critical Region.
PB85-151793 514,724

FLUORESCENCE
Fluorescent Dyes for Luminescent Solar Concentrators.
N85-13061/5/GAR 514,919

Petrographic and Fluorescence Spectral Properties of Liptinite and Vitrinite Coal Macerals.
PB85-154722/GAR 515,672

FLUTTER
Finite Element Analysis of Nonlinear Oscillations and Flutter of Shells of Revolution.
AD-A149 071/3/GAR 515,577

Flutter Parametric Studies of Cantilevered Twin-Engine-Transport Type Wing with and Without Winglet. Volume 1: Low-Speed Investigations.
N85-13269/4/GAR 514,339

Flutter Parametric Studies of Cantilevered Twin-Engine Transport Type Wing with and Without Winglet. Volume 2: Transonic and Density Effect Investigations.
N85-13270/2/GAR 514,340

FLUTTER ANALYSIS
Flutter Parametric Studies of Cantilevered Twin-Engine-Transport Type Wing with and Without Winglet. Volume 1: Low-Speed Investigations.
N85-13269/4/GAR 514,339

FLY ASH
Field-Flow Fractionation in the Analysis of Energy Related Materials. Progress Report, February 1, 1984-January 31, 1985.
DE85000869/GAR 514,676

Molten Salt Reactor for Dispersed Solid Phase Chlorination.
DE85002611/GAR 514,678

Etat des Connaissances Relatives a l'Utilisation en Remblais Routiers de Cendres Volantes de Fraiche Production Provenant d'une ou de Plusieurs Centrales Electriques (Study of Physical Characteristics of Freshly Produced Fly-Ash from the Exhaust Gases of Coal-Fired Power Stations).
PB85-139426/GAR 515,094

Ponding of Effluents from Fossil Fuel Steam Electric Power Plants.
PB85-144244/GAR 515,106

FLYWHEEL ENERGY STORAGE
Flywheel Energy Storage Systems as Vehicle Drive Elements.
DE84770486/GAR 514,951

FMIT LINAC
Spectral Effects in FMIT (Fussion Materials Irradiation Test Facility).
DE85001407/GAR 515,321

FOCUSING
Focusing Effects of a Laser Beam in the Nonresonant Multiphoton Ionization MPI(Multiphoton Ionization) of Gases.
N85-13231/4/GAR 515,573

FOOD
Look at Meat and Poultry Production in the Soviet Union.
AD-A148 937/6/GAR 514,605

Private Sector: Regulation of Rural Markets in Africa.
PB85-140150/GAR 514,349

Food Aid and Development: The Impact and Effectiveness of Bilateral PL 480 Title 1-Type Assistance.
PB85-140572/GAR 514,553

Report of an Exploratory Workshop on the Role of Anthropologists and other Social Scientists in Interdisciplinary Teams Developing Improved Food Production Technology.
PB85-142651/GAR 514,352

Mauritania: Rural Assessment and Manpower Surveys. The Food and Nutritional Situation in Mauritania.
PB85-144582/GAR 514,608

FOOD ADDITIVES
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PB85-854909/GAR 514,611

FOOD ASSISTANCE PROGRAMS
Food Aid and Development: The Impact and Effectiveness of Bilateral PL 480 Title 1-Type Assistance.
PB85-140572/GAR 514,553

FOOD CHAINS
Radioecological Investigations of Uranium Mill Tailings Systems. Fifth Technical Progress Report, October 1, 1983-September 30, 1984.
DE85000005/GAR 515,422

Water Pollution: Uptake of Heavy Metals by Shellfish and Marine Plants. 1974-February 1985 (Citations from Oceanic Abstracts).
PB85-855237/GAR 514,603

FOOD CONSUMPTION
Socio-Economic Determinants of Food Consumption and Production in Rural Sierra Leone: Application of an Agricultural Household Model with Several Commodities.
PB85-145696/GAR 514,609

FOOD DEPRIVATION
Food Deprivation and Exercise in the Heat: Thermoregulatory and Metabolic Effects,
AD-A148 847/7/GAR 514,660

FOOD PACKAGING
Food Packaging and Storage. June 1977-February 1985 (Citations from the NTIS Data Base).
PB85-855088/GAR 514,612

FOOD SERVICE
Cold Weather 83 Evaluation of the Mobile Food Service Unit and Tray Packs.
AD-A148 850/1/GAR 514,604

Field Feeding System to Support USMC Forces in the 1990s.
AD-A148 953/3/GAR 514,606

FOOD SERVICES
FDA (Food and Drug Administration) Retail Food Protection Program Information Manual.
PB85-152767/GAR 514,610

FORAGE CROPS
Production, Storage and Feeding of Herbaceous Forages to Support Ruminant Livestock in Developing Countries of the Tropics and Subtropics.
PB85-143089/GAR 514,374

FORCE DISTRIBUTION
Flight and Wind-Tunnel Comparisons of the Inlet-Airframe Interaction of the F-15 Airplane.
N85-12884/1/GAR 514,334

FOREIGN AID
Economic Development of Korea: Sui Generis or Generic.
PB85-136760/GAR 514,465

FOREIGN AID PROGRAMS
Women in Development.
PB85-136661/GAR 514,549

FOREIGN COUNTRIES
All Non-Communist Country Reports.
PB85-928000/GAR 514,492

FOREIGN POLICY
Soviet Mid-Term Objectives, Strategies, and Prospects in Sub-Saharan Africa.
AD-A148 941/8/GAR 514,495

FOREIGN TECHNOLOGY
Mode of Action of Polyamine Analogues on the Growth and Biochemistry of Leishmanial Cells.
AD-A148 857/6/GAR 514,637

Alignment Fixture for a Two-Degree-of-Freedom (TDF) Gyroscope.
AD-A148 885/7/GAR 515,300

Distributed Data Processing Design Methodology.
AD-A148 888/1/GAR 514,804

Strapdown Navigation Algorithms Implemented in the Inertial and Geographic Frames.
AD-A148 908/7/GAR 515,301

Anticholinesterase Effects on Number and Function of Brain Muscarinic Receptors and Central Cholinergic Activity: Drug Intervention.
AD-A148 973/1/GAR 514,640

Review of the Pollution Abatement Programs Relating to the Petroleum Refinery Industry in the Great Lakes Basin.
AD-A149 008/5/GAR 515,082

Axial Velocity Spread Acceptance of Free Electron Lasers.
AD-A149 024/2/GAR 515,544

Conference Proceedings of Operational Loads Data Held at Sienna, Italy on 2-6 April 1984,
AD-A149 025/9/GAR 514,329

Process Modeling Applied to Metal Forming and Thermomechanical Processing,
AD-A149 027/5/GAR 515,146

Conference Proceedings of Engine Cyclic Durability by Analysis and Testing,
AD-A149 028/3/GAR 515,680

Thermospheric Energy Flux of the Semidiurnal Tide.

AD-A149 029/1/GAR *514,404*

Conformal Mapping Suitable for Problems Involving Interaction Between Given Geometries and Known Far Fields.
AD-A149 050/7/GAR *515,030*

Array Processor Utilisation in the Computation of Real-Time Images.
AD-A149 051/5/GAR *515,302*

Long Term Durability of Urea Formaldehyde Glued Joints Removed from Vampire Aircraft.
AD-A149 053/1/GAR *514,332*

Improving the Fatigue Life of the Mirage IIIO Wing Main Spar.
AD-A149 054/9/GAR *514,333*

Measurement of the Depth of a Sonar Array.
AD-A149 056/4/GAR *515,279*

Comparison of Nomex and Evolution 3 for Use in Tent Liners.
AD-A149 057/2/GAR *514,984*

Measurement of Local Heat Flux Density and Local Ion Saturation Current Density in a Plasma Jet--Translation.
AD-A149 060/6/GAR *515,570*

Railgun Plasma Armature Characterisation Experiments.
AD-A149 063/8/GAR *514,784*

Effects of Impurities and Additives on the Growth of Polycrystalline TNT.
AD-A149 085/3/GAR *514,691*

Extracts from Symposium Countersurveillance '83 Held at Melbourne, Australia on 27 and 28 April, 1983.
AD-A149 086/1/GAR *515,299*

Study of the Requirements of an Electronic Message Handling Facility.
AD-A149 087/9/GAR *514,819*

Present Status of Uranium-Plutonium Mixed Carbide Fuel Development for LMFBR.
DE84017212/GAR *515,474*

Technical Equipment for Rescuing Injured Miners in Case of Roof Breaks in Coal Faces and Roadways.
DE84752107/GAR *514,757*

Increase of Efficiency in Cooled High Temperature Turbines. Phase I.
DE84752109/GAR *515,681*

Test Field Pellworm for Wind Turbines.
DE84752110/GAR *514,882*

Iran - Energy Situation 1983.
DE84770428/GAR *514,883*

CSSR - Energy Situation 1980/81.
DE84770470/GAR *514,884*

Fuel Savings by Advanced Vehicle Drive Systems.
DE84770472/GAR *515,126*

Industrial Exhaust-Air Purification Employing the Process of Adsorption to Activated Carbon.
DE84770477/GAR *515,085*

Combustion of Industrial Waste Gases, Residual and Waste Liquids and Fluids.
DE84770478/GAR *514,986*

Use of Energy in Agricultural Households.
DE84770479/GAR *514,885*

Flywheel Energy Storage Systems as Vehicle Drive Elements.
DE84770486/GAR *514,951*

Indonesia - Energy Situation 1982/83.
DE84770487/GAR *514,886*

Nigeria - Energy Situation 1982/83.
DE84770488/GAR *514,887*

Rotational Sound Development in Axial Turbomachinery and the Propagation in the Connected Tubing.
DE84770493/GAR *514,888*

Experimental Investigations on the Reaction Structure in Folded Pre-Mixed Flame Fronts.
DE84770495/GAR *515,594*

Theoretical and Experimental Investigations on the Fluid-Structure-Interactions in an Oscillation Model of a Pressurized Water Reactor.
DE84770496/GAR *515,435*

Noise Emission of Technical Diffusion Flames in Dependence of Mixing Parameters, Burner Dimensions and Air Preheating for Fuel Gases with Different Flame Velocities.
DE84770498/GAR *515,595*

Joint Venezuelan-German Feasibility Study: Integrated Production and Upgrading Including Energy Supply for Orinoco Heavy Oil. Pt. A.
DE84770500/GAR *515,606*

Some Environmental Aspects of Optimal Economic Growth.
DE84770505/GAR *514,459*

Energy Raw Materials in the Alps-Adria Region.
DE84770506/GAR *514,889*

Optimal Growth Policies for Resource-Dependent Open Economies.
DE84770507/GAR *514,460*

Syria - Energy Situation 1982.
DE84770508/GAR *514,890*

Survey of Energy Consumption in Switzerland in 1983.
DE84770509/GAR *514,891*

Progress Report for the Period 1st January Until 31st December 1983.
DE84770514/GAR *514,892*

Canada Center for Mineral and Energy Technology: Open File Reports, List No. 17.
DE84901396/GAR *514,758*

Processing of Highly Radioactive Nuclear Waste.
DE84901805/GAR *515,387*

Piezoelectric Stress Transducer Used for Measurements of Explosions in Hard Rock.
DE85000300/GAR *515,509*

Isolation Valves of Steam Generators (Hopkinsons Valves) - Broken Bolts. Evaluation Report.
DE85001530/GAR *515,442*

Nuclear Power.
DE85002334/GAR *515,563*

Method of Final Conditioning of Solid Radioactive Wastes.
DE85900002/GAR *515,417*

Etude Par Anemometrie Laser d'Ecoulements Decolles sur des Profils d'Aile (Laser Anemometer Study of Separated Flow on Wing Profiles).
N85-12872/6/GAR *514,324*

Adaptation de Parois a Mach 1.2 (Wall Adaptation at Mach 1.2).
N85-12873/4/GAR *515,213*

Singularitaeten-Modell Zur Analyse der Wandinterferenz in Geschlossenen Windkanalen Nach der Wanddrucksignatur-Methode (Blockierung und Auftrieb) (Singularity Model for the Analysis of Wall Interference in Closed Wind Tunnels According to the Wall Pressure Signature Method (Blockage and Lift)).
N85-12874/2/GAR *515,214*

Wandeinfluss-Korrekturen in Windkanaelen: Blockierungskorrektur Nach der Wandrucksignatur-Methode (Wall Influence Corrections in Wind Tunnels: Blockage Correction According to the Wall Pressure Signature Method).
N85-12875/9/GAR *515,215*

Parametrische Bestimmung der Blockierungsinterferenzen fuer Drei-Dimensionale Modelle im Transonic-Kanal des Eidgenoessisches Flugzwerk, Emmen (Parametric Determination of Blockage Interference of 3-Dimensional Models in the Emmen Federal Aircraft Works Transonic Tunnel (Switzerland)).
N85-12876/7/GAR *515,216*

Grenzschichtuntersuchungen im Transonic-Kanal des Eidgenoessisches Flugzwerke, Emmen (Investigations of Boundary Layers in the Emmen Federal Aircraft Works Transonic Tunnel, Switzerland).
N85-12877/5/GAR *515,217*

Vergleichende Stroemungsrechnung an Transsonischen Kegel/Zylinder-Eidhmodellen im Zusammenhang MIT Dem Wandinterferenzproblem (Comparative Flow Calculation on Transonic Cone/Cylinder Standard Models in Connection with the Wall Interference Problem).
N85-12878/3/GAR *515,218*

Local Slot Boundary Condition for Transonic Flow Calculations in Slotted-Wall Test Sections of Wind Tunnels.
N85-12879/1/GAR *515,219*

Analise E Simulacao de Um Sistema Inercial (Strapdown) de Determinacao de Altitude Auxiliado Por Estimacao Adaptativa DA Deriva (Analysis and Simulation of an Inertial System (Strapdown) for Auxiliary Attitude Determination by Adaptive Drift Estimation).
N85-12882/5/GAR *515,303*

Les Materiaux Structuraux Modernes Situation Actuelles et Perspectives d'Evolution (Modern Structural Materials. Present Situation and Evolution Prospects).
N85-12886/6/GAR *514,335*

Graphische Software Zur Darstellung der Deformationsbewegung Eines Koerpers (Graphics Software for the Display of Body Deformation Motion).
N85-12888/2/GAR *514,336*

Development and Fabrication of Refractory Bodies for Gas Turbine Engines.
N85-12899/9/GAR *515,686*

Untersuchung Zur Verbesserung der Transonic-Kanal-Messstrecke des Eidgenoessisches Flugzwerke, Emmen (Investigation for the Improvement of the Transonic Tunnel Working Section of the Emmen Federal Aircraft Works (Switzerland)).
N85-12904/7/GAR *515,221*

Colloquium About Joint Projects within DFVLR/ISRO(Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt/Indian Space Research Organization, Bangalore, Satellite Centre) Cooperation.
N85-12907/0/GAR *515,703*

Mars Dust Sample Return Mission.
N85-12915/3/GAR *515,704*

Mission Interstellaire (Interstellar Mission).
N85-12916/1/GAR *515,705*

Les Systemes de Lancements (Launching Systems).
N85-12917/9/GAR *515,721*

Technologies des Missiles Tactiques: Recherches et Perspectives d'Avenir (Tactical Missiles Technologies. Research and Prospectives).
N85-12925/2/GAR *515,276*

Space Know-How, Twenty Years' Space Experience.
N85-12926/0/GAR *515,715*

Essai 17.208: Statistique sur les Caracteristics de Base des Composites Carbone-Epoxy (Traction) (Test Report No. 17.208: Statistics of the Basic Characteristics of Carbon-Epoxy Composites).
N85-12979/9/GAR *514,975*

Influence de la Relaxation sur les Caracteristiques Mecaniques d'UN Composite Carbone Epoxy, Procse-Verbal No. 45.427/1 (Influence of Relaxation on the Mechanical Characteristics of a Carbon-Epoxy Composite. Report No. 45.427/1).
N85-12980/7/GAR *514,976*

Assurance Qualite des Materiaux Composites, Proces-Verbal No. 45-649/F (Quality Assurance of Composite Materials, Test Report No. 45-649/F).
N85-12981/5/GAR *514,977*

Preparation of Sinter-Active Silicon Carbide Powders.
N85-12982/3/GAR *514,978*

Mathematical Models for the Boiling Diagram of the Ideal Two-Component Mixture.
N85-13000/3/GAR *514,701*

Development and Testing of Thin Film Cells for High Temperature Water Vapor Electrolysis.
N85-13001/1/GAR *514,702*

PRIAMUS: Ein Rechenprogramm zur Bestimmung Thermophysikalischer Stoffwerte von Gasmischungen Aus O2, N2, CO, CO7, He, H2O, H2 und CH4 (PRIAMUS, a Computer Program for the Calculation of Thermophysical Properties of Gas Mixtures Containing O2, N2, CO, CO2, He, H2O, H2, CH4).
N85-13002/9/GAR *514,703*

Combustion Waves in Dispersed-2-Phase Mixtures.
N85-13003/7/GAR *514,704*

Structural Changes During Milling of Aluminum Oxide Powders.
N85-13008/6/GAR *514,959*

Reactive Sintering of SiC.
N85-13010/2/GAR *514,960*

Ion Contrasting Chamber for Discrimination of Grains and Textures.
N85-13036/7/GAR *514,993*

Corrosions des Laitons de Robinetterie (Corrosion of Brass in Potable Water Service).
N85-13037/5/GAR *514,994*

Interactions Between Corrosion and Creep of Uncoated and Coated Superalloys in Sulfate Melts.
N85-13038/3/GAR *514,995*

Development of Rapidly Quenched Alloys with Special Physical Properties and of Processes for Their Continuous Production.
N85-13039/1/GAR *514,996*

Study of the Pore Structure of Ceramics Prepared by the Slip Casting Method.
N85-13048/2/GAR *514,962*

Essai 17.202: Caracterisation de Resine Polyimide (Polyimide Resin Characteristics, Test).
N85-13049/0/GAR *514,979*

Fluorescent Dyes for Luminescent Solar Concentrators.
N85-13061/5/GAR *514,919*

Optimisation de l'Injection des Thermoplastiques Thermostables Peek Renforces de Fibres Courtes de Carbone (Optimization of the Injection Process for Thermostatic Polyether-Ether-Ketone (Peek) Thermoplastics Reinforced with Short Carbon Fibers).
N85-13062/3/GAR *515,013*

Official Journey to USA, November 1983. Symposium on the Compatibility of Explosives; Mound Laboratory; Naval Surface Weapons Center.
N85-13072/2/GAR *515,500*

Method for Evaluating Petrol Products Corrosivity Using Piezoelectric Crystals. Part 2: Instruction Manual.
N85-13073/0/GAR *515,669*

Bulletin of the Faculty of Engineering, Hokkaido University, No. 123.
N85-13075/5/GAR *514,446*

L'Electroformage du Nickel (Electroforming of Nickel).
N85-13085/4/GAR *515,148*

Limitantes DA Equivocacao Em Canais Gaussianos Aditivos (Equivocation Limits in Gaussian Additive Channels).
N85-13137/3/GAR *514,858*

Transmission de la Television en Modulation de Frequence (Television Transmission in Frequency Modulation).
N85-13146/4/GAR *515,285*

Systeme de Telecommunications Par Satellite Telecom 1 (The Telecom 1 Satellite Telecommunication System).
N85-13147/2/GAR *515,286*

Methodology for the Implementation of a Domestic Satellite Communications Network.
N85-13148/0/GAR *515,287*

Carrier Acquisition and Tracking by a COSTAS Loop with Automatic Frequency Control.
N85-13149/8/GAR *515,288*

Apollo System Requirements Specification.
N85-13150/6/GAR *515,289*

Transmission Analysis for the Use of 2-4 PSK (Phase Shift Keying) Modulation in Satellite Broadcasting.
N85-13151/4/GAR *515,290*

Digital Radio Link: Wave Propagation Measurements Using Narrow Band Technique.
N85-13152/2/GAR *515,291*

KEYWORD INDEX

Digital Image Processing; Report from a Conference and Study Trip to the USA and Canada, Summer 1984.
N85-13153/0/GAR *514,821*

Essais de Susceptibilite a Une Agression Electromagnetique (Tests for Susceptibility to Electromagnetic Attack).
N85-13154/8/GAR *515,345*

Implementing Waveguide Bandwidth Six-Port Reflectometer Circuits at Millimetric Wavelengths.
N85-13155/5/GAR *515,222*

Les Transistors MOS de Puissance (Metal Oxide Semiconductors Power Transistors).
N85-13166/2/GAR *514,792*

Simulation d'Une Chaine de Transmission a Elements Faiblement Non Lineaires. Calcule des Produits d'Intermodulation sur UN Signal Compose de N Porteuses (Simulation of a Transmission Circuit Composed of Slightly Nonlinear Elements. Computation of the Intermodulation on Signals Composed of N Carriers).
N85-13167/0/GAR *514,859*

Conception de Circuits Assistee Par Ordinateur: Realisation de Masques pour l'Elaboration de Circuits Microondes (Computerized Circuit Designs: Realization of Masks to Manufacture Microwave Circuits).
N85-13168/8/GAR *515,150*

Les Composants Electroniques pour Applications Spatiales (Electronic Components for Space Applications).
N85-13169/6/GAR *514,849*

Qualification of a Thick Film Hybrid.
N85-13170/4/GAR *514,864*

Pulse Injection on a Power Cable Penetrating a Shielding Wall by Feed-Through Capacitors.
N85-13171/2/GAR *514,793*

Improvement of Lightning Arresters Energy Capability.
N85-13172/0/GAR *514,794*

Partikelmitfuehrung in Einem Kompressablen Wirbel (Particle Entrainment in a Compressible Vortex).
N85-13192/8/GAR *515,532*

Etudes des Correlations Vitesse-Pression Acoustique Conditionnees sur le Signe et l'Amplitude de la Fluctuation de Vitesse dans UN Jet Froid (Study of the Velocity-Acoustic Pressure Correlation in a Cold Jet, Centered on the Sign and the Amplitude of the Velocity Fluctuations).
N85-13193/6/GAR *515,516*

Model Equations Describing Unsteady Fluid Motion.
N85-13194/4/GAR *515,533*

Numerical Calculation of Steady Turbulent Flows in Adverse Pressure Gradients.
N85-13195/1/GAR *515,534*

Progress in the Development of a Two-Fluid Model of Turbulence for Near-Wall Flows, Part 1.
N85-13196/9/GAR *515,535*

Progress in the Development of a Two-Fluid Model of Turbulence for Near-Wall Flows. Part 3: Preliminary Investigation of a Stably-Stratified Boundary Layer.
N85-13197/7/GAR *515,536*

Proposal for Wall Function for Friction and Heat Transfer in the Presence of Roughness and Mass Transfer.
N85-13198/5/GAR *515,537*

Organ-Pipe Oscillation.
N85-13199/3/GAR *515,178*

Laminar Jet Issuing into Stagnant Surroundings.
N85-13200/9/GAR *515,538*

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Development of Components for Micro-C Oriented Sensor Systems.
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Magnetic Inductive Flowmeter for Low Conducting Liquids.
N85-13216/5/GAR *515,225*

Development of a Feasibility Model for a Thin-Film Precision Power Meter.
N85-13217/3/GAR *515,226*

Instrumented Impact Testing Machine with Reduced Specimen Oscillation Effects.
N85-13218/1/GAR *515,227*

Ion Beam Lithography.
N85-13219/9/GAR *515,151*

Laser for Determining the Ignition Conditions of a Pyrotechnic Mixture.
N85-13230/6/GAR *515,598*

Focusing Effects of a Laser Beam in the Nonresonant Multiphoton Ionization MPI(Multiphoton Ionization) of Gases.
N85-13231/4/GAR *515,573*

Improved Sensitivities in Laser Interferometers for the Detection of Gravitational Waves.
N85-13232/2/GAR *515,574*

Conduite d'Une Cellule Flexible d'Usinage (Design of a Flexible Machining System).
N85-13252/0/GAR *515,152*

Surveillance des Machines (The Monitoring of Machines).
N85-13253/8/GAR *515,167*

L'Organisation de la Qualite (Quality Organization).
N85-13257/9/GAR *515,255*

Fiabilite Composants et Technologies d'Assemblage (Component Reliability and Assembling Technologies).
N85-13258/7/GAR *515,153*

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Deformations Non-Lineaires et Flambage Statique Lineaire de Structures Soumises a des Forces de Pression (Nonlinear Deformation and Static Linear Buckling of Structures under Pressure).
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Methode d'Essais de Telecabines (Test Methods for Cable Cars).
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Inzameling en Opslag van Cabauwmetingen: Een Systeemvoorstel (Acquisition and Storage of Cabauw Measurements: A System Proposal).
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Operationele Numerieke Voorspellingen: Overzicht en Verifikatie over de Periode 1978-1983 (Operational Numerical Forecasts: Survey and Verification over the Period 1978-1983).
N85-13435/1/GAR *514,418*

Experiments with Hydrox at 1.3 Mpa (13 ATM).
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Entwurf und Implementierung Eines Modularen Programmsystems Zur Durchfuehrung Statistischer Analysen (Design and Implementation of a Modular Program System for Statistical Analyses).
N85-13503/6/GAR *514,825*

Formats for Numerical and Textual Data in Data Processing.
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Self-Tuning Control of Offset: A Unified Approach.
N85-13520/0/GAR *515,038*

Long-Range Predictive Control Using Weighting-Sequence Models.
N85-13521/8/GAR *515,039*

Inducao de Regras de Decisao Nebulosas (Induction of Fuzzy Decision Rules).
N85-13525/9/GAR *515,053*

Interval Mathematics Reports.
N85-13536/6/GAR *515,042*

Unrestricted Convergence for Generalized Poisson Integrals.
N85-13540/8/GAR *515,043*

Measure Determining Classes of Balls in Banach Space.
N85-13541/6/GAR *515,044*

Interpolating Sequences for H to Infinity in the Ball.
N85-13542/4/GAR *515,045*

Time Discretization of Parabolic Problems by the Discontinuous Galerkin Method.
N85-13543/2/GAR *515,046*

Loeb Sobolev Spaces with Applications to Variational Integrals and Differential Equations.
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Qualificazione di Sistemi Non-Invasivi Per la Rivelazione on-Line di Perdite in Preriscaldatori d'Acqua Alimento AD Alta Pressione (Qualification of Noninvasive Systems for on-Line Leak Detection in High Pressure Feed Water Preheaters).
N85-13555/6/GAR *515,230*

Mesure des Precharges de Serrage dans les Assemblages Boulonnes Par Methode Ultrasonore (Measurement of the Preloading of Bolted Joints by the Ultrasonic Method).
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N85-13590/3/GAR *514,710*

Investigation and Development of Multicolored Liquid Crystal Display Systems for Automotive Dashboard Application and Large Format Information Boards.
N85-13652/1/GAR *515,128*

Experimentelle Zustandsgleichung fuer Bosonenga (Experimental Equations of State for Boson Gases).
N85-13659/6/GAR *515,588*

Selecao de Projetos de p and D COM Retornos Nao-Numericos (R and D Project Selection with Nonnumerical Returns).
N85-13665/3/GAR *515,054*

Forschungsbericht 1979-1982. Teil 2: Projektteil (Research Report 1979-1982. Part 2: Projects).
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N85-13682/8/GAR *514,325*

Un Systeme de Documentation Electronique (An Electronic Documentation System).
N85-13683/6/GAR *514,449*

L'Analyse de la Valeur (Value Analysis).
N85-13684/4/GAR *514,463*

International Comparative Study of Systems for the Government Advancement of Research and Development.
N85-13689/3/GAR *514,500*

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PB85-137743/GAR *514,980*

Copper-Nickel and Copper-Nickel-Iron. Applications and Corrosion.
PB85-137966/GAR *514,998*

Digital Signatures - An Update,
PB85-138337/GAR *514,831*

Some Experiences of Testing Protocol Implementations,
PB85-138345/GAR *514,832*

Prediction of Long Term Strength of Glass Reinforced Plastics in Wet Environments,
PB85-138360/GAR *514,981*

Automatic Analysis of Speckle Photographs by Microcomputer,
PB85-138378/GAR *515,235*

Drinking and Driving Habits, Attitudes, and Behaviour of Male Motorists.
PB85-138436/GAR *514,548*

Dynamical Studies Using Muons,
PB85-138733/GAR *515,585*

Shape of the Fusion Boundary in an Electromagnetically Stirred Weld Pool,
PB85-138774/GAR *515,154*

Role of Mining in the South African Economy,
PB85-139226/GAR *514,467*

Underlying Factors in the Development of Demand Responsive Transport in Britain,
PB85-139236/GAR *515,093*

Reflections on Britain's Nuclear History: A Conversation with Lord Hinton,
PB85-139269/GAR *515,372*

Tensile and Creep Properties of DT2906: Dispersion-Strengthened Ferritic Steel Tubes,
PB85-139335/GAR *514,999*

Some Issues in Dynamic Modelling and Forecasting,
PB85-139350/GAR *514,468*

Etat des Connaissances Relatives a l'Utilisation en Remblais Routiers de Cendres Volantes de Fraiche Production Provenant d'une ou de Plusieurs Centrales Electriques (Study of Physical Characteristics of Freshly Produced Fly-Ash from the Exhaust Gases of Coal-Fired Power Stations),
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Vibrational Power Transmission of an Idealised Gearbox.
PB85-139632/GAR 515,170

Effect of Hydrostatic Pressure on the Tensile Properties of Alpha Uranium,
PB85-139640/GAR 515,000

Creep Characterization of a Type 316 Austenitic Steel,
PB85-139665/GAR 515,001

Nuclear Effects in Deep Inelastic Lepton Scattering,
PB85-139749/GAR 515,565

Derivative Expansions of Fermion Determinants: Anomaly-Induced Vertices, Goldstone-Wilczek Currents, and Skyrme Terms,
PB85-139756/GAR 515,566

Deconfining Transitions in 2+ 1 Dimensional SU(3) and SU(4) Gauge Theories,
PB85-139764/GAR 515,575

Scales of Deconfinement,
PB85-139772/GAR 515,567

Reliable Stable Storage System for UNIX (Trade Name).
PB85-139780/GAR 514,833

Communication System Supporting Large Datagrams on a Local Area Network.
PB85-139798/GAR 514,834

Effect of Strain Rate and Temperature on the Tensile Behaviour of Uranium 2 (sup w)/o Molybenum,
PB85-139830/GAR 515,002

Structural Use of Chipboard for Flooring: State of the Art Report.
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Copper Nickel and Copper Nickel Iron: Properties and Processing.
PB85-140028/GAR 515,003

Communications Protocols for Local Area Networks.
PB85-140564/GAR 514,835

Continuous Casting of Copper and It's Alloys.
PB85-140614/GAR 515,004

Modelling, Implementation and Use of a Traffic Simulator for NPDN (Nordic Public Data Network),
PB85-140838/GAR 515,292

I-PIGS: A Concurrent Programming Environment with Interactive Graphical Support,
PB85-140846/GAR 514,836

Robustesse des Regulateurs de Pilotage Multivariables Continus: Synthese de l'Etude (Strength of Continuous Multivariable Piloting Regulators: Study Synthesis),
PB85-140853/GAR 514,343

Basis for a Geometric Modeller,
PB85-140861/GAR 514,837

Ventilation Efficiency. Part 4. Displacement Ventilation in Small Rooms,
PB85-140879/GAR 515,073

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PB85-140887/GAR 515,074

Calcul d'Ecoulements Internes a Grand Nombre de Reynolds par Resolution Numerique des Equations de Navier-Stokes (Computation of Internal Flows at High Reynolds Number by Numerical Solution of the Navier-Stokes Equations),
PB85-140895/GAR 515,539

Exploitation de Calculs Tridimensionnels dans les Compresseurs Transoniques (Development of Computations of Three Dimensional Flow through Transonic Compressors),
PB85-140903/GAR 515,540

Etudes Aerodynamiques Liees au Developpement des Divergents Deployables (Aerodynamic Studies of Deployment Devices),
PB85-140911/GAR 515,277

Experimental Study of Turbulent Jet Diffusion Flames (Revised Version),
PB85-140929/GAR 515,599

Occupancy, Income and General Statistics of South African Hotels for 1979.
PB85-141042/GAR 514,474

Robustesse de Regulateurs de Pilotage Multivariables (Strength of Multivariable Piloting Regulators),
PB85-141570/GAR 514,344

Interaction Fatigue - Fluage dans les Composites Carbone/Resine + or - 45 degrees (Interaction Fatigue - Creep in Carbon/Resin Compounds + or - 45 degrees),
PB85-141588/GAR 514,982

Etude, par la Methode de Coin, de la Composition B2141 (SNPE): Correlation entre l'Amorcabilite et la Formulation d'un Explosif a Liant Plastique (Wedge-Technique Investigation of Composite Explosive B2141 (SNPE). Correlation between Ignitability and Formation of an Explosive with Plastic Bond),
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PB85-143139/GAR 515,237

Modifications to FURDEC (Furnace Heat Transfer Program) to Include Self-Consistent Flame Modelling,
PB85-143154/GAR 515,075

Worldwide Nuclear Plant Performance Revisited: An Analysis of 1978-81 Experience.
PB85-143188/GAR 515,468

Dynamic Stark-Effect in Thallium,
PB85-143204/GAR 514,712

Extrapolation of Engine Inlet Measurements According to Tsukahira,
PB85-143212/GAR 515,690

Analysis of Single-Mode Evanescent-Field-Pumped Dye Amplifier,
PB85-143238/GAR 515,547

Interfaces under Laser Irradiation,
PB85-143246/GAR 515,524

Technical Change in a Newly Industrializing Country: A Case Study of the Impacts on Employment and Skills in the Brazilian Textiles Industry.
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PB85-143758/GAR 515,503

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PB85-144681/GAR 515,241

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PB85-145068/GAR 515,006

Mise au Point d'un Laser HF de Faible Puissance (Perfecting a Low-Power HF Laser),
PB85-145076/GAR 515,548

Recovery and Recycling of Tin in Tinplate Plant,
PB85-145084/GAR 515,007

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FOREST MANAGEMENT

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FORESTRY

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PB85-141745/GAR 515,099

FORESTS

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PB85-137800/GAR 515,670

FORMAT

Formats for Numerical and Textual Data in Data Processing.
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FOSSIL-FUEL POWER PLANTS

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FOULING

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FOUNDATIONS

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DE85000032/GAR 515,610

FOUR-PI COUNTING

4 pi Detectors.
DE85002605/GAR 515,359

FRACTURE (MECHANICS)

Physics of Fracture.
PB85-145241 515,582

FRACTURE PROPERTIES

Direct Comparison of Unloading Compliance and Potential Drop Techniques in J-Integral Testing.
DE85001550/GAR 514,988

FRACTURE STRENGTH

Tough Composite Materials.
N85-12941/9/GAR 514,973

Toughening Mechanism in Elastomer-Modified Epoxy Resins, Part 2.
N85-13046/6/GAR 515,018

FRACTURES (MATERIALS)

Physics of Fracture.
PB85-145241 515,582

FRANGIBLE

Variable Density Frangible Projectile.
PAT-APPL-6-666 785/GAR 515,501

FREE ELECTRON LASERS

Two-Stage Free Electron Laser Research.
AD-A148 951/7/GAR 515,543

Axial Velocity Spread Acceptance of Free Electron Lasers.
AD-A149 024/2/GAR 515,544

Free Electron Laser with a Rotating Quadrupole Wiggler.
AD-A149 052/3/GAR 515,545

FREEZING
Freezing and Blocking of Water Pipes.
AD-A148 943/4/GAR *515,175*

FREQUENCY DIVISION MULTIPLEXING
Fiber Optic Data Bus Using Frequency Division Multiplexing (FDM) (Frequency Division Multiplexing) and an Asymmetric Coupler.
N85-13139/9/GAR *515,284*

FREQUENCY MODULATION
Transmission de la Television en Modulation de Frequence (Television Transmission in Frequency Modulation).
N85-13146/4/GAR *515,285*

FRESH WATER FISHES
Mauritania: Rural Assessment and Manpower Surveys. Inland Fisheries.
PB85-144558/GAR *514,575*

FRETTING
Effect of Humidity on Fretting Wear of Several Pure Metals.
N85-13006/0/GAR *514,992*

FUEL ASSEMBLIES
FFTF Fuel Assembly Outlet Temperature Measurements and Comparison to Predictions.
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Follow-On 40-kW Field Test Support.
PB85-151322/GAR *514,926*

FUEL CELLS
Fuel Cell Reaction in Super Acid Electrolytes.
PB85-155978/GAR *514,726*

FUEL COMBUSTION
Combustion Waves in Dispersed-2-Phase Mixtures.
N85-13003/7/GAR *514,704*

FUEL-COOLANT INTERACTIONS
Comparison of L04, L05, and L07: Three Irradiated 7-Pin Bundle TUCOP Tests.
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DE84014734/GAR *515,432*

FUEL ECONOMY
Fuel Savings by Advanced Vehicle Drive Systems.
DE84770472/GAR *515,126*

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ELAF Failed Fuel Plate Examination.
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FUEL PINS
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DE84014751/GAR *515,472*

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FUEL REPROCESSING PLANTS
Determination of Iodine Specific Activity in Nuclear Fuel Reprocessing Plant off-Gases.
DE85000193/GAR *515,475*

Krypton-85 Health Risk Assessment for a Nuclear Fuel Reprocessing Plant.
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Amphibian Chromomycosis.
AD-A148 874/1/GAR *514,567*

FURNACES
Modifications to FURDEC (Furnace Heat Transfer Program) to Include Self-Consistent Flame Modelling.
PB85-143154/GAR *515,075*

FUZZY SETS
Inducao de Regras de Decisao Nebulosas (Induction of Fuzzy Decision Rules).
N85-13525/9/GAR *515,053*

Selecao de Projetos de p and D COM Retornos Nao-Numericos (R and D Project Selection with Nonnumerical Returns).
N85-13665/3/GAR *515,054*

GALACTIC RADIATION
Far-Infrared Line Emission from the Galaxy.
N85-13702/4/GAR *514,390*

GALERKIN METHOD
Time Discretization of Parabolic Problems by the Discontinuous Galerkin Method.
N85-13543/2/GAR *515,046*

GALILEO PROJECT
Mission Science Value-Cost Savings from the Advanced Imaging Communication System (AICS) (Advanced Imaging Communication System).
N85-12905/4/GAR *515,283*

GALLIUM ARSENIDES
Metal-Semiconductor Field-Effect Transistors Fabricated in GaAs Layers Grown Directly on Si Substrates by Molecular Beam Epitaxy.
AD-A149 001/0/GAR *514,782*

High-Temperature Optically Activated GaAs Power Switching for Aircraft Digital Electronic Control.
N85-12901/3/GAR *514,337*

Effect of Barrier Height on Friction Behavior of the Semiconductors Silicon and Gallium Arsenide in Contact with Pure Metals.
N85-13044/1/GAR *514,791*

GALLIUM INDIUM ARSENIDES
Surface and Interfacial Properties of Ga(0.47)In(0.53)As Alloys.
AD-A148 891/5/GAR *515,583*

GAME THEORY
Strategic Analysis for Safeguards Systems: A Feasibility Study. Vol. 1. Main Report.
NUREG/CR-3926-V1/GAR *515,483*

Strategic Analysis for Safeguards Systems: A Feasibility Study. Vol. 2. Appendix.
NUREG/CR-3926-V2/GAR *515,484*

GAMMA DOSIMETRY
Personnel Radiation Dosimetry Symposium: Program and Abstracts.
DE85002198/GAR *515,382*

GAMMA IRRADIATION
Evaluation of the Effects of Gamma Irradiation on the Mechanical Properties of High Density Polyethylene.
NUREG/CR-3898/GAR *515,012*

GAMMA RADIATION
Use of Calibration Standards and the Correction for Sample Self-Attenuation in gamma-Ray Nondestructive Assay.
DE85002347/GAR *515,339*

GAMMA SOURCES
WESF sup 137 Cs gamma Ray Sources.
DE85000676/GAR *515,562*

GAMMA SPECTROSCOPY
Use of Calibration Standards and the Correction for Sample Self-Attenuation in gamma-Ray Nondestructive Assay.
DE85002347/GAR *515,339*

GAS ANALYSIS
Evaluation of Cryogenic Trapping As a Means for Collecting Organic Compounds in Ambient Air.
PB85-144046/GAR *515,239*

GAS CHROMATOGRAPHY
Development of Acceptance Criteria for Batches of Silane Primer for External Tank Thermal Protection System Bonding Applications.
N85-13043/3/GAR *514,681*

Evaluation of Cryogenic Trapping As a Means for Collecting Organic Compounds in Ambient Air.
PB85-144046/GAR *515,239*

GAS COMPRESSORS
6000 Tpd SRC-I Demonstration Plant Gas Systems. Design Baseline Package, Volume 7.
DE85001240/GAR *515,626*

GAS DETECTORS
Air Sampling Devices. March 1976-January 1985 (Citations from the Energy Data Base).
PB85-854792/GAR *515,252*

GAS DYNAMICS
Experimentelle Zustandsgleichung fuer Bosonenga (Experimental Equations of State for Boson Gases).
N85-13659/6/GAR *515,588*

Magnetohydrodynamic and Gasdynamic Theories for Planetary Bow Waves.
N85-13760/2/GAR *514,399*

GAS FLOW
Internal Forced Convection to Low Prandtl Number Gas Mixtures.
AD-A148 932/7/GAR *515,587*

Energy Flowmeter Development, Phases 1 and 2.
PB85-149748/GAR *514,925*

GAS HYDRATES
In-Situ Hydrate Thermal Measurements Project Status.
DE85002698/GAR *515,663*

GAS IONIZATION
Focusing Effects of a Laser Beam in the Nonresonant Multiphoton Ionization MPI(Multiphoton Ionization) of Gases.
N85-13231/4/GAR *515,573*

GAS JETS
Etudes des Correlations Vitesse-Pression Acoustique Conditionnees sur le Signe et l'Amplitude de la Fluctuation de Vitesse dans UN Jet Froid (Study of the Velocity-Acoustic Pressure Correlation in a Cold Jet, Centered on the Sign and the Amplitude of the Velocity Fluctuations).
N85-13193/6/GAR *515,516*

GAS MIXTURES
PRIAMUS: Ein Rechenprogramm zur Bestimmung Thermophysikalischer Stoffwerte von Gasmischungen Aus O2, N2, CO, CO7, He, H2O, H2 und CH4 (PRIAMUS, a Computer Program for the Calculation of Thermophysical Properties of Gas Mixtures Containing O2, N2, CO, CO2, He, H2O, H2, CH4).
N85-13002/9/GAR *514,709*

Experiments with Hydrox at 1.3 Mpa (13 ATM).
N85-13471/8/GAR *514,622*

GAS PIPELINES
Pipeline Accident Report - Boston Gas Company, Natural Gas Overpressure, Explosion and Fires, East Boston, Massachusetts, September 23, 1983.
PB84-916505/GAR *515,182*

Internal Seal for Repairing Natural Gas Mains.
PB85-142685/GAR *514,957*

GAS RESERVOIRS
Co-Production of Gas and Water, Third Year.
PB85-156974/GAR *514,769*

GAS SEALS
Internal Seal for Repairing Natural Gas Mains.
PB85-142685/GAR *514,957*

GAS SUPPLY
Interstate Pipeline's Annual Report of Gas Supply, 1981-1983 (FERC-15).
PB85-128064/GAR *514,768*

GAS TURBINE ENGINES
Development and Fabrication of Refractory Bodies for Gas Turbine Engines.
N85-12899/9/GAR *515,686*

High-Temperature Erosion of Plasma-Sprayed, Yttria-Stabilized Zirconia in a Simulated Turbine Environment.
N85-13045/8/GAR *514,961*

GAS TURBINES
Conference Proceedings of Engine Cyclic Durability by Analysis and Testing.
AD-A149 028/3/GAR *515,680*

Study of Deposition Control Using Transpiration. Technical Progress Report, September 1984.
DE85000215/GAR *515,682*

GASES
Velocity-Changing Collisional Effects in Nonlinear Atomic Spectroscopy and Photon Echo Decay in Gases.
N85-13559/8/GAR *514,707*

Effect of Ventilation and Perfusion Imbalance on Inert Gas Rebreathing Variables.
PB85-144087 *514,650*

GASIFICATION
Importance of Active Sites for Char Gasification in Oxygen (Air) and Carbon Dioxide.
PB85-155984/GAR *515,673*

Biogasification of Walt Disney World Biomass Waste Blend.
PB85-156958/GAR *515,674*

Biological Gasification of Renewable Resources.
PB85-156966/GAR *515,675*

GASOLINE
Market Behavior under Partial Price Controls: The Case of the Retail Gasoline Market.
DE85002666/GAR *515,662*

GAUGE THEORY
Deconfining Transitions in 2+ 1 Dimensional SU(3) and SU(4) Gauge Theories,
PB85-139764/GAR 515,575

Scales of Deconfinement,
PB85-139772/GAR 515,567

GEAR BOXES
Vibrational Power Transmission of an Idealised Gearbox.
PB85-139632/GAR 515,170

GEARS
Effect of Lubricant Extreme-Pressure Additives on Surface Fatigue Life of AISI 9310 Spur Gears.
N85-13234/8/GAR 515,166

GENERAL AVIATION AIRCRAFT
Full-Scale Crash-Test Evaluation of Two Load-Limiting Subfloors for General Aviation Airframes.
N85-13267/8/GAR 514,338

GENERAL OFFICERS
E. C. Meyer, General, United States Army, Chief of Staff, June 1979-June 1983.
AD-A149 006/9/GAR 514,520

GENETIC ENGINEERING
Pulp and Paper Industry Energy Impacts Through Implementation of Biotechnologies.
DE85002377/GAR 515,019

Opportunities for Energy Conservation Through Biotechnology.
DE85002660/GAR 515,661

Genetic Engineering: Monoclonal Antibodies. 1980-February 1985 (Citations from the U. S. Patent Data Base).
PB85-855369/GAR 514,600

GENETICS
Genetic Effects of Microwave Exposure on Mammalian Cells In Vitro. Volume 2. Appendix A. Cytogenetics and Growth Kinetics Data, 850 MHz.
AD-A148 866/7/GAR 514,652

Genetic Effects of Microwave Exposure on Mammalian Cells In Vitro. Volume 2. Appendix B. Cytogenetics and Growth Kinetics Data, 1.2 GHz.
AD-A148 867/5/GAR 514,653

Genetic Engineering: Plasmids. 1970-February 1985 (Citations from the U. S. Patent Data Base).
PB85-855179/GAR 514,577

GEOCHEMISTRY
Assessment of Drilling Fluid Tracers Used to Monitor Borehole Development for Hydrochemical Sampling.
DE85001222/GAR 515,400

Progress in Evaluation of Radionuclide Geochemical Information Developed by DOE (Department of Energy) High-Level Nuclear Waste Repository Site Projects: Report for April-June 1984.
NUREG/CR-3851-V3/GAR 515,419

GEOIDS
Lithospheric Structure in the Pacific Geoid.
N85-13365/0/GAR 514,739

GEOLOGIC FRACTURES
Transport and Capture of Colloidal Particles in Single Fractures.
DE85000413/GAR 515,390

GEOLOGIC STRUCTURES
Structural Geology of Southeastern Illinois and Vicinity.
NUREG/CR-4036/GAR 514,744

Development of a Predictive Model for Porosity Distribution in the Smackover Formation of Southwest Alabama.
PB85-139202/GAR 514,749

GEOLOGICAL FAULTS
Petrologic Model of the Northern Mississippi Embayment Based on Satellite Magnetic and Ground Based Geophysical Data.
N85-13406/2/GAR 514,746

GEOLOGICAL SURVEYS
Hill AFB, Utah Installation Restoration Program. Phase IIB, IRP Survey. Volume 1. Text. Volume 2. Appendices.
AD-A149 013/5/GAR 514,742

Relatorio Do Trabalho de Campo Realizado NAS Bacias DOS Rios Quebra Osso E Tanque Preto, NA Quadricula de Catas Altas, Minas Gerais (Report of the Field Work Performed in the Basins of the Quebra Osso and Tanque Petro Rivers in the Catas Altas Quadrangle, Minas Gerais).
N85-13359/3/GAR 514,745

GEOLOGY
Selected Geologic Literature Lower Mississippi Valley Division Area Index and Annotated Bibliography. Supplement 6.
AD-A148 945/9/GAR 514,741

Index to Published Geologic Maps in the Region around the Potential Yucca Mountain Nuclear Waste Repository Site, Southern Nye County, Nevada.
DE85000260/GAR 515,389

Archean Sedimentation and Tectonics in Southern Africa.
N85-13408/8/GAR 514,748

GEOMAGNETISM
Contribuciones Cientificas Para Conmemorar El 75 Aniversario Del Observatorio Del Ebro (Scientific Contributions in Commemoration of Ebro Observatory's 75TH Anniversary).
N85-13308/0/GAR 514,406

Petrologic Model of the Northern Mississippi Embayment Based on Satellite Magnetic and Ground Based Geophysical Data.
N85-13406/2/GAR 514,746

GEOMETRIC MODELLING
Basis for a Geometric Modeller,
PB85-140861/GAR 514,637

GEOPHYSICAL EXPLORATION
Development of a Predictive Model for Porosity Distribution in the Smackover Formation of Southwest Alabama.
PB85-139202/GAR 514,749

GEOPHYSICAL OBSERVATORIES
Contribuciones Cientificas Para Conmemorar El 75 Aniversario Del Observatorio Del Ebro (Scientific Contributions in Commemoration of Ebro Observatory's 75TH Anniversary).
N85-13308/0/GAR 514,406

GEOPHYSICAL PROSPECTING
Military Hydrology. Report 6. Assessment of Two Currently 'Fieldable' Geophysical Methods for Military Ground-Water Detection.
AD-A148 968/9/GAR 514,755

GEOPHYSICS
Activities at the Lunar and Planetary Institute.
N85-13694/3/GAR 514,386

GEOSTROPHIC WIND
Alternative to Reduction of Surface Pressure to Sea Level.
N85-13422/9/GAR 514,415

GEOTHERMAL ENERGY
Congressional Budget Request, FY 1985. Volume 2. Energy Supply Research and Development; Nuclear Waste Fund.
DE84009775/GAR 514,875

Geothermal Energy Technology.
PB85-914700/GAR 514,927

GEOTHERMAL ENERGY CONVERSION
International Test and Demonstration of a 1-Mw Wellhead Generator: Helical Screw Expander Power Plant.
N85-13372/6/GAR 514,946

GEOTHERMAL HEATING SYSTEMS
Optimization of Design and Control Strategies for Geothermal Space Heating Systems. Final Report.
DE85000496/GAR 514,899

GEOTHERMAL POWER PLANTS
Leak Detectors for Organic Rankine Cycle Power Plants: On-Line and Manual Methods.
DE85002792/GAR 514,943

Special Function Instruments for Binary Cycle Geothermal Power Plants.
DE85003109/GAR 514,915

GEOTHERMAL RESOURCES
International Test and Demonstration of a 1-Mw Wellhead Generator: Helical Screw Expander Power Plant.
N85-13372/6/GAR 514,946

GEOTHERMAL SPACE HEATING
College of Idaho Geothermal System, Caldwell, Idaho.
DE85002329/GAR 514,909

GEOTHERMAL WELLS
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DE84016037/GAR 514,880

Geothermal Pumping Systems.
DE85002246/GAR 514,907

GIANT STARS
Outer Atmospheres of Giant and Supergiant Stars.
N85-13703/2/GAR 514,391

GLIAL CELLS
Immortal Line of Human Fetal Glial Cells.
PAT-APPL-6-857 630/GAR 514,572

GLIDE PATHS
Realistic Localizer Courses for Aircraft Instrument Landing Simulators.
N85-12885/8/GAR 514,531

GLIDERS
Comparison of Wortmann Airfoil Computer-Generated Lift and Drag Polars with Flight and Wind Tunnel Results.
N85-12868/4/GAR 514,321

GLOBAL
Reference Tables and Graphs for World Wheat Trade.
PB85-145027/GAR 514,359

GLOBAL POSITIONING SYSTEM
Transdigitizer for Relaying Signals from Global Positioning System (GPS) Satellites.
PAT-APPL-6-666 784/GAR 515,305

Separating the Variances of Noise Components in the Global Positioning System.
PB85-151710 515,306

GLOMAR JAVA SEA VESSEL
Marine Accident Report - Capsizing and Sinking of the United States Drillship GLOMAR JAVA SEA in the South China Sea, 65 Nautical Miles South-Southwest of Hainan Island, People's Republic of China, October 25, 1983.
PB84-916408/GAR 515,181

GOLD
Calculation of Si(Li) X-Ray Detector Efficiencies.
DE85002732/GAR 515,211

GOVERNMENT EMPLOYEES
Physician Evaluation of Impairment/Disability.
HRP-0906093/0/GAR 514,619

GOVERNMENTS
International Comparative Study of Systems for the Government Advancement of Research and Development.
N85-13689/3/GAR 514,500

GRAIN BOUNDARIES
Ion Contrasting Chamber for Discrimination of Grains and Textures.
N85-13036/7/GAR 514,993

GRANULAR BED FILTERS
Laboratory/Bench Scale Testing and Evaluation of A.P.T. Dry Plate Scrubber. Fifty-Fifth Monthly Report, September 1-September 30, 1984.
DE85001015/GAR 515,088

GRAPHITE
Iodine Sorption/Desorption from Low-Alloy Steel and Graphite. Draft.
DE85000966/GAR 515,477

GRAPHITE-EPOXY COMPOSITES
Composite Structural Materials.
N85-12966/6/GAR 514,974

Essai 17.208: Statistique sur les Caracteristics de Base des Composites Carbone-Epoxy (Traction) (Test Report No. 17.208: Statistics of the Basic Characteristics of Carbon-Epoxy Composites).
N85-12979/9/GAR 514,975

Influence de la Relaxation sur les Caracteristiques Mecaniques d'UN Composite Carbone Epoxy, Proces-Verbal No. 45.427/1 (Influence of Relaxation on the Mechanical Characteristics of a Carbon-Epoxy Composite. Report No. 45.427/1).
N85-12980/7/GAR 514,976

Essai 17.202: Caracterisation de Resine Polyimide (Polyimide Resin Characteristics, Test).
N85-13049/0/GAR 514,979

GRASSLAND
Effects of SO2 on a Grassland: A Case Study in the Northern Great Plains of the United States,
PB85-137354/GAR 514,371

GRAVITATIONAL WAVES
Improved Sensitivities in Laser Interferometers for the Detection of Gravitational Waves.
N85-13232/2/GAR 515,574

GRAVITY ANOMALIES
Lithospheric Structure in the Pacific Geoid.
N85-13365/0/GAR 514,739

GREENHOUSE EFFECT
Changing Climate. Report of the Carbon Dioxide Assessment Committee.
DE85001845/GAR 514,413

GROUND SOURCE HEAT PUMPS
Assessment of Ground-Coil Heat-Pump Technology.
DE85002567/GAR 515,071

GROUND SUBSIDENCE
Subsidence in the Craters of Nuclear Tests at the Pacific Proving Grounds.
DE85000747/GAR 515,344

GROUND WATER
Military Hydrology. Report 6. Assessment of Two Currently 'Fieldable' Geophysical Methods for Military Ground-Water Detection.
AD-A148 968/9/GAR 514,755

Mathematical Modeling and Evaluation of Radionuclide Transport Parameters from the ANL Laboratory Analog Program.
DE85000782/GAR 515,393

Engineered Sorbent Barriers for Low-Level Waste.
DE85000833/GAR 515,397

Transport Assessment - Arid: Measurement and Prediction of Water Movement Below the Root Zone.
DE85000834/GAR 515,398

Assessing the Performance of Geologic Repositories for Nuclear Waste.
DE85001197/GAR 515,399

Assessment of Drilling Fluid Tracers Used to Monitor Borehole Development for Hydrochemical Sampling.
DE85001222/GAR 515,400

Distribution of Radionuclides and Water in Bandelier Tuff Beneath a Former Los Alamos Liquid Waste Disposal Site after 33 Years.
DE85001406/GAR 515,402

Organic Complexant-Enhanced Mobility of Toxic Elements in Low-Level Wastes.
DE85002375/GAR 515,410

In Situ gamma-Ray Spectrometric Analysis of Radionuclide Distributions at a Commercial Shallow Land Burial Site.
DE85002376/GAR 515,411

Radionuclide Migration in Groundwater - Annual Report for FY 1983.
NUREG/CR-3712/GAR 515,423

Public Groundwater Supplies in Will County,
PB85-138550/GAR 514,753

KEYWORD INDEX

GUAM
Solid Waste Management Options for Naval Installations on Guam.
AD-A148 947/5/GAR *515,081*

GUATEMALA
Children and Women in Traditional and Cash Crop Agriculture: A Preliminary Cross-Section Study of Economic Development in Guatemala,
PB85-143709/GAR *514,355*

GUIDED MISSILE TRACKING SYSTEMS
Directory of Range Data Conversion and Processing Systems.
AD-A148 996/2/GAR *515,273*

GUIDED MISSILE WARHEADS
Calculation through Fault Tree Analysis of the Probability of a Warhead Being Armed Prior to Launch,
AD-P004 339/8/GAR *515,274*

Preventing Explosive Propagation in Racks or Containers of Tactical Missiles,
AD-P004 342/2/GAR *515,275*

GUIDED MISSILES
Preventing Explosive Propagation in Racks or Containers of Tactical Missiles,
AD-P004 342/2/GAR *515,275*

GUIDELINES
Guidance for the Reregistration of Manufacturing-Use and Certain End-Use Pesticide Products Containing Dialate.
PB85-144814/GAR *514,368*

GUN BARRELS
Evaluation of Titanium Diboride Gun Tube Coatings.
AD-A148 901/2/GAR *515,511*

Projectile Motion in a Flexible Gun Tube.
AD-A149 022/6/GAR *515,507*

GUN PROPELLANTS
Effects of Perforation L/D Ratio and Slotting on Stick Propellant Combustion.
AD-A148 854/3/GAR *515,490*

GUNN DIODES
Coaxial Cavity Gunn Oscillator Using Probe Coupled Microstrip.
PAT-APPL-6-679 972/GAR *514,867*

Integrated Varactor Tuned Coaxial Gunn Oscillator for 60 GHz Operation.
PAT-APPL-6-679 974/GAR *514,868*

GYROSCOPES
Alignment Fixture for a Two-Degree-of-Freedom (TDF) Gyroscope.
AD-A148 885/7/GAR *515,300*

H CODES
Comparison of Structural Computer Programs Used for the Analysis of Spent Fuel Shipping Casks.
DE85002444/GAR *515,385*

HALL EFFECT
Electron-Phonon Interactions and the Breakdown of the Dissipationless Quantum Hall Effect.
PB85-151505 *515,586*

Hall Effect Devices. 1975-February 1985 (Citations from the INSPEC: Information Services for the Physics and Engineering Communities Data Base).
PB85-855385/GAR *514,800*

HAMILTON-JACOBI EQUATIONS
Neumann Type Boundary Conditions for Hamilton-Jacobi Equations.
AD-A149 068/7/GAR *515,031*

Hamilton-Jacobi Equations in Infinite Dimensions. Part 1. Uniqueness of Viscosity Solutions,
AD-A149 094/5/GAR *515,035*

HAMMING CODES
Undetected Error Probability for Shortened Hamming Codes.
N85-13535/8/GAR *514,860*

HANDBOOKS
Direct Coal Combustion Data Handbook.
DE85001028/GAR *515,624*

H8-1 and H8-2 Cataloging Handbooks.
PB85-120483/GAR *514,451*

Specifications, Tolerances, and Other Technical Requirements for Weighing and Measuring Devices as Adopted by the 69th National Conference on Weights and Measures, 1984 (1985 Edition).
PB85-157550/GAR *515,251*

HANDICAPPED CHILDREN
Benefits of Early Intervention for Special Children,
PB85-148484/GAR *514,562*

HANDICAPPED PERSONS
Underlying Factors in the Development of Demand Responsive Transport in Britain,
PB85-139236/GAR *515,093*

HANDLING
Simplified Grasping and Manipulation with Dextrous Robot Hands.
AD-A148 962/4/GAR *515,163*

HANFORD RESERVATION
Closeout Report for the Decontamination and Decommissioning of the 203-S, 204-S, 205-S Facilities.
DE85002502/GAR *515,414*

HAPO
Rockwell Hanford Operations Defense Waste and Byproducts Management Monthly Report for July 1984.
DE85000558/GAR *515,391*

HARBORS
Laboratory Investigation of Marina Entrances on the Missouri River.
AD-A148 858/4/GAR *515,077*

HARD SURFACING
Hard Facing Alloys. 1970-February 1985 (Citations from the Engineering Index Data Base).
PB85-855070/GAR *515,009*

HARVESTING
Assessment of Biomass Harvesting on Small Woodlots in New Hampshire.
DE85000681/GAR *514,378*

HARVESTING EQUIPMENT
Continued Development of the Residue Baler. Final Report.
DE85000682/GAR *514,379*

HAZARDOUS MATERIALS
ORNL (Oak Ridge National Laboratory) Resource Conservation and Recovery Training Program.
DE85000167/GAR *514,526*

Fail-Safe Devices for the Prevention of Hazardous Material Spills.
PB85-138642/GAR *515,236*

Standard Operating Procedures for Conducting Sampling and Sample Bank Audits,
PB85-143279/GAR *515,238*

HAZARDOUS MATERIALS SPILLS
Fail-Safe Devices for the Prevention of Hazardous Material Spills.
PB85-138642/GAR *515,236*

HAZARDS
JANNAF(Joint-Army-Navy-NASA-Air Force) Propulsion Systems Hazards Subcommittee Meeting (1984) Held at Army Ballistic Research Laboratory, Aberdeen Proving Ground, Maryland on 18-20 June 1984. Volume 1.
AD-A148 865/9 *515,697*

Report on AGARD Meeting Hazards Studies for Solid Propellant Rocket Motors,
AD-P004 340/6/GAR *515,695*

Antiplane Cracks in Solid Propellants,
AD-P004 344/8/GAR *515,699*

Study of Seismicity and Earthquake Hazard in Northern Alabama and Adjacent Parts of Tennessee and Georgia.
NUREG/CR-4058-V1/GAR *514,772*

HE-3 COUNTERS
Universal Fast Breeder Reactor Subassembly Counter Manual.
DE85001523/GAR *515,349*

HEALTH
Improving Infant Nutrition, Health and Survival: Policy and Program Implications from the Malaysian Family Life Survey,
PB85-141653/GAR *514,607*

Housing and Health: An Analysis for Use in the Planning, Design, and Evaluation of Low-Income Housing Programs,
PB85-143063/GAR *514,556*

HEALTH INSURANCE
Knowledge of Their Health Insurance Coverage by the Elderly,
PB85-139921/GAR *514,588*

HEALTH PLANNING
Guide to Health Planning Law: A Topical Digest of Health Planning and Certificate of Need Case Law,
HRP-0905965/0/GAR *514,584*

Compendium of the Substantive Resource Development Materials of the Plan Documents File.
HRP-0905992/4/GAR *514,445*

HEALTH RISKS
Social Roles and the Health of American Women.
PB85-147452/GAR *514,620*

HEALTH STATUS
Social Roles and the Health of American Women.
PB85-147452/GAR *514,620*

HEART
Tests of the Application of the Radioactive Microsphere Technique to the Measurement of Regional Myocardial Blood Flow,
PB85-142727/GAR *514,649*

HEAT RECOVERY
Reliability, Availability, and Maintainability of the Heat Recovery Incinerator at Naval Air Station , Jacksonville.
AD-A148 884/0/GAR *515,057*

Method for Controlled Burnout of Abandoned Coal Mines and Waste Banks.
PATENT-4 387 655 *514,923*

HEAT RESISTANT ALLOYS
Interactions Between Corrosion and Creep of Uncoated and Coated Superalloys in Sulfate Melts.
N85-13038/3/GAR *514,995*

HEAT STRESS (PHYSIOLOGY)
Skeletal Muscle Metabolism during Exercise is Influenced by Heat Acclimation,
AD-A148 845/1/GAR *514,658*

HEAT TRANSFER
Internal Forced Convection to Low Prandtl Number Gas Mixtures.
AD-A148 932/7/GAR *515,587*

Analytical Formula for Fuel Particle to Liquid Sodium Heat Transfer.
DE84014734/GAR *515,432*

Oil-Flow Study of a Space Shuttle Orbiter Tip-Fin Controller.
N85-12920/3/GAR *515,714*

Proposal for Wall Function for Friction and Heat Transfer in the Presence of Roughness and Mass Transfer.
N85-13198/5/GAR *515,537*

HEAVY ION ACCELERATORS
RHIC And Quark Matter: Proposal for a Relativistic Heavy Ion Collider at Brookhaven National Laboratory.
DE85002610/GAR *515,557*

HEAVY ION REACTIONS
GSI-LBL Plastic Ball/Wall Spectrometer.
DE85001651/GAR *515,351*

Large Acceptance Spectrometers for pi exp 0 Mesons.
DE85002472/GAR *515,357*

HEAVY METALS
Effects of Cadmium on the Population Growth of a Benthic Invertebrate Aeolosoma Headleyi (Oligochaeta).
PB85-144079 *514,671*

HELICAL FLOW
International Test and Demonstration of a 1-Mw Wellhead Generator: Helical Screw Expander Power Plant.
N85-13372/6/GAR *514,946*

HELIPORTS
Structural Design Guidelines for Heliports.
AD-A148 967/3/GAR *514,345*

HELIUM
Separation of Helium-Methane Mixtures by Single-Column Pressure Swing Adsorption.
DE85002785/GAR *514,699*

HELMETS
Helmets: Construction, Effectiveness, and Human Factors. 1970-February 1985 (Citations from the NTIS Data Base).
PB85-854784/GAR *514,651*

HELMHOLTZ FUNCTION
Thermodynamic Properties of Isobutane-Isopentane Mixtures from 240 to 600K and up to 20 MPa (with Supplemental Tables from -40 to + 600F and up to 1000 psia).
PB85-154581/GAR *514,725*

HEPATITIS A VIRUS
Etude des Hepatites Virales (Study of Viral Hepatitis).
PB85-142768/GAR *514,590*

HETEROCYCLIC COMPOUNDS
Method for Making Heterocyclic Block Copolymers.
PAT-APPL-6-610 912/GAR *514,685*

HHIRF
Status Report on the ORNL (Oak Ridge National Laboratory) 25 URC Accelerator.
DE85002498/GAR *515,554*

HIGH ASPECT RATIO
Flutter Parametric Studies of Cantilevered Twin-Engine Transport Type Wing with and Without Winglet. Volume 2: Transonic and Density Effect Investigations.
N85-13270/2/GAR *514,340*

HIGH DENSITY POLYETHYLENES
Evaluation of the Effects of Gamma Irradiation on the Mechanical Properties of High Density Polyethylene,
NUREG/CR-3898/GAR *515,012*

HIGH-FREQUENCY HEATING
Safety Assessment for the RF Test Facility.
DE84017063/GAR *515,310*

HIGH LEVEL LANGUAGES
Ada (Trademark) Primer.
AD-A148 855/0/GAR *514,801*

HIGH-LEVEL RADIOACTIVE WASTES
Processing of Highly Radioactive Nuclear Waste.
DE84901805/GAR *515,387*

Transport and Capture of Colloidal Particles in Single Fractures.
DE85000413/GAR *515,390*

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Preclosure Radiological Calculations to Support Salt Site Evaluations.
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HIGH REYNOLDS NUMBER
Study of the Structure of Turbulent Shear Flows at Supersonic Speeds and High Reynolds Number.
N85-12865/0/GAR 515,531

HIGH SPEED
Effect of Two Inner-Ring Oil-Flow Distribution Schemes on the Operating Characteristics of a 35 Millimeter Bore Ball Bearing to 2.5 Million Dn.
N85-13233/0/GAR 515,165

HIGH-TEMPERATURE FUEL CELLS
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HIGHWAY BRIDGES
Long Span Bridge Deflections.
PB85-136683/GAR 515,192

HIGHWAY TRANSPORTATION
Surface Transportation: Demands and Needs. 1980-February 1985 (Citations from the NTIS Data Base).
PB85-855229/GAR 515,117

HIGHWAYS
Highway Statistics, 1983.
PB85-139913/GAR 515,096

Environmental Aspects of Transportation,
PB85-145134/GAR 515,111

HILBERT SPACE
Remark on Regularization in Hilbert Spaces.
AD-A149 046/5/GAR 515,027

HISTORIC PRESERVATION
Archeological Testing Work, Multi-Purpose Impoundment 4M, Robinson Creek Watershed, Lincoln County, Oklahoma.
PB85-144665/GAR 514,559

Geomorphology and Archaeology of Carnegie Canyon, Fort Cobb Laterals Watershed, Caddo County, Oklahoma.
PB85-144673/GAR 514,511

HMX
Environmental Fate Studies of HMX Screening Studies. Phase 1.
AD-A148 978/0/GAR 515,493

HOLE GEOMETRY (MECHANICS)
Stress Intensity Factors for Corner Cracks at Holes Located Near an Edge.
N85-13279/3/GAR 515,579

HOLOGRAMS
Diffraction Diffusion Screen with Holographically-Suppressed Zero-Order Beam.
PAT-APPL-6-667 194/GAR 515,551

HOLOGRAPHY
X-Ray Holography of Biological Specimens.
DE85002437/GAR 514,656

HONDURAS
Study of the Cooperative Movement in Honduras,
PB85-133635/GAR 514,346

HORMONES
Modulation of the Cytosolic Androgen Receptor in Striated Muscle by Sex Steroids.
N85-13468/2/GAR 514,642

HOSPITAL INFORMATION SYSTEMS
Hospital Information Systems. 1970-January 1985 (Citations from the NTIS Data Base).
PB85-854800/GAR 514,454

HOSPITAL SERVICES
Readjustment of Older Persons After Acute Hospitalization.
PB85-147494/GAR 514,597

HOSPITALS
Medical Technology and Costs of the Medicare Program.
PB85-146215/GAR 514,596

HOT PRESSING
Development and Fabrication of Refractory Bodies for Gas Turbine Engines.
N85-12899/9/GAR 515,686

HOT SPOTS
Some Aspects of the Micromechanics of Hot Spot Formation in Energetic Materials,
AD-P004 348/9/GAR 515,495

HOTELS
Occupancy, Income and General Statistics of South African Hotels for 1979.
PB85-141042/GAR 514,474

HOUSEHOLD INCOME
Mauritania: Rural Assessment and Manpower Surveys. Rural Income in Mauritania.
PB85-144574/GAR 514,484

HOUSEHOLDS
Use of Energy in Agricultural Households.
DE84770479/GAR 514,885

Socio-Economic Determinants of Food Consumption and Production in Rural Sierra Leone: Application of an Agricultural Household Model with Several Commodities.
PB85-145696/GAR 514,609

HOUSES
Tightening Your Home for Energy Efficiency.
DE85000037/GAR 514,893

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DE85001152/GAR 515,068

HTGR TYPE REACTORS
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DE85001738/GAR 515,443

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HUMAN BEHAVIOR
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Human Role in Space. Volume 3: Generalizations on Human Roles in Space.
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HUMAN FACTORS ENGINEERING
Human Role in Space. Volume 2. Research Analysis and Technology Report.
N85-13474/0/GAR 515,710

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Investigation and Development of Multicolored Liquid Crystal Display Systems for Automotive Dashboard Application and Large Format Information Boards.
N85-13652/1/GAR 515,128

Human Factors Engineering in Motor Vehicles. 1976-February 1985 (Citations from the Engineering Index Data Base).
PB85-854990/GAR 514,506

HUMAN PERFORMANCE
Experiments with Hydrox at 1.3 Mpa (13 ATM).
N85-13471/6/GAR 514,622

HUMAN POPULATIONS
Krypton-85 Health Risk Assessment for a Nuclear Fuel Reprocessing Plant.
DE85000838/GAR 514,615

Preclosure Radiological Calculations to Support Salt Site Evaluations.
DE85001539/GAR 515,403

HUMAN RELATIONS
Employee and Customer Perceptions of Service in Banks: Replication and Extension.
AD-A148 907/9/GAR 514,542

HUMIDIFIERS
Health Equipment Information Number 128, October 1984 (Evaluation Issue).
PB85-135614/GAR 514,627

HUMIDITY
Effect of Humidity on Fretting Wear of Several Pure Metals.
N85-13006/0/GAR 514,992

HYBRID CIRCUITS
Qualification of a Thick Film Hybrid.
N85-13170/4/GAR 514,864

HYDRAULIC VALVES
Fixed-Cone Valve Prototype Tests, New Melones Dam, California.
AD-A148 939/2/GAR 515,174

HYDROCARBONS
Chemistry and Morphology of Coal Liquefaction. Annual Report, October 1, 1983-September 30, 1984.
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Development of a Predictive Model for Porosity Distribution in the Smackover Formation of Southwest Alabama.
PB85-139202/GAR 514,749

Application of the Extended Corresponding States Model to Hydrocarbon Mixtures (Computer Program EXCST).
PB85-151744 514,721

HYDRODYNAMICS
New Methods for Numerical Solution of One Class of Strongly Nonlinear Partial Differential Equations with Applications in Hydrodynamics.
AD-A149 026/7/GAR 515,023

HYDROELECTRIC POWER
Congressional Budget Request, FY 1985. Volume 2. Energy Supply Research and Development; Nuclear Waste Fund.
DE84009775/GAR 514,875

Underground Pumped Hydroelectric Storage.
DE85000288/GAR 514,953

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HYDROELECTRIC POWER GENERATION
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HYDROELECTRIC POWER STATIONS
International Test and Demonstration of a 1-Mw Wellhead Generator: Helical Screw Expander Power Plant.
N85-13372/6/GAR 514,946

HYDROGEN
Resonantly Enhanced Multiphoton Ionization of Molecules.
DE85000585/GAR 514,693

Hydrogen Flame Acceleration and Transition to Detonation.
DE85000611/GAR 515,378

Molecular Dynamics Study of the Reaction: H Sub 2 + OH Yields H sub 2 O + H.
DE85000624/GAR 514,694

6000 Tpd SRC-I Demonstration Plant Gas Systems. Design Baseline Package, Volume 7.
DE85001240/GAR 515,626

6000 Tpd SRC-I Demonstration Plant Gas Systems. Design Baseline Package. Volume 4.
DE85001682/GAR 515,629

Calculation of Si(Li) X-Ray Detector Efficiencies.
DE85002732/GAR 515,211

HYDROGEN DEUTERIDE
Production of HD Gas by Controlled Reaction of LIAID sub 4 and H sub 2 O.
DE85000420/GAR 514,675

HYDROGEN FLUORIDE LASERS
Mise au Point d'un Laser HF de Faible Puissance (Perfecting a Low-Power HF Laser),
PB85-145076/GAR 515,548

HYDROGEN IONS
Focusing Effects of a Laser Beam in the Nonresonant Multiphoton Ionization MPI(Multiphoton Ionization) of Gases.
N85-13231/4/GAR 515,573

HYDROGEN PRODUCTION
Solar Photochemical Process Engineering for Production of Fuels and Chemicals.
DE85000335/GAR 515,616

Review of Solar Fuel-Producing Quantum Conversion Processes.
DE85000336/GAR 515,617

Hydrogen from Solar Energy.
DE85001914/GAR 515,633

Photosynthetic Water Splitting.
DE85002460/GAR 515,654

Artificial Photosynthesis with Algal and Reconstituted Systems.
DE85002557/GAR 515,660

Development and Testing of Thin Film Cells for High Temperature Water Vapor Electrolysis.
N85-13001/1/GAR 514,702

Solar-Assisted Hydrogen Generation by Photoelectrocatalysis.
PB85-149706/GAR 514,730

HYDROGEN SULFIDES
Laser-Based Diagnostics for Coal Gasification Instrumentation.
DE85002385/GAR 515,652

HYDROGENATION
Hydrodesulfurization by Reduced Molybdenum Sulfides: Activity and Selectivity of Chevrel Phase Catalysts.
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HYDROGRAPHY
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AD-A149 013/5/GAR 514,742

HYDROLOGY
Manejo de Cuencas y Monitoreo Ambiental (Watershed Resources Management and Environmental Monitoring),
PB85-141711/GAR 515,098

HYDROPHONES
Transducer Hydrophone with Filled Reservoir.
PAT-APPL-6-663 969/GAR 515,233

HYDROXIDES
Alpha-Form of the Hydroxides of Bivalent Metals.
N85-13009/4/GAR 514,705

HYDROXYL RADICAL
Kinetics of Nitric Oxide Formation in Laminar and Turbulent Methane Combustion.
PB85-149698/GAR 514,716

HYDROXYL RADICALS
Molecular Dynamics Study of the Reaction: H Sub 2 + OH Yields H sub 2 O + H.
DE85000624/GAR 514,694

HYLIFE CONVERTER
Comparison of Three ICF Reactor Designs.
DE85001211/GAR 515,320

HYPERACTIVE CHILDREN
Effects of Tempo and Intensity on Hyperactive Children.

KEYWORD INDEX

AD-A148 934/3/GAR *514,544*

HYPERBOLIC DIFFERENTIAL EQUATIONS
Loeb Sobolev Spaces with Applications to Variational Integrals and Differential Equations.
N85-13544/0/GAR *515,047*

HYPERFINE STRUCTURE
Untersuchung der K Wechselwirkung bei Stossenergien Zwischen 0.5 und 5.7 Ev (Investigation on K (4 2P3/2) Hg Interaction at Collision Energies from 0.5 to 5.7 Ev).
N85-13589/5/GAR *514,709*

HYPERTHERMIA
Food Deprivation and Exercise in the Heat: Thermoregulatory and Metabolic Effects.
AD-A148 847/7/GAR *514,660*

HYPERVELOCITY IMPACT
Particle Velocity Experiments in Anorthosite and Gabbro.
N85-13407/0/GAR *514,747*

I CODES
Comparison of Structural Computer Programs Used for the Analysis of Spent Fuel Shipping Casks.
DE85002444/GAR *515,385*

ICE MAPPING
Ice-Soil Mixtures: Visual and Near-Infrared Remote Sensing Techniques.
N85-13358/5/GAR *514,775*

IGNEOUS ROCKS
Particle Velocity Experiments in Anorthosite and Gabbro.
N85-13407/0/GAR *514,747*

IGNITION
Bulletin of the Faculty of Engineering, Hokkaido University, No. 123.
N85-13075/5/GAR *514,446*

Laser for Determining the Ignition Conditions of a Pyrotechnic Mixture.
N85-13230/6/GAR *515,596*

ILLUSIONS
Bulletin of the Faculty of Engineering, Hokkaido University, No. 123.
N85-13075/5/GAR *514,446*

IMAGE CONTRAST
Ion Contrasting Chamber for Discrimination of Grains and Textures.
N85-13036/7/GAR *514,993*

IMAGE ENHANCEMENT
Noise Removal in Multichannel Images.
N85-13526/7/GAR *514,829*

IMAGE PROCESSING
Processing of Global Area Coverage (GAC) Data of the TIROS-N/NOAA Series Polar Orbiters.
AD-A148 992/1/GAR *514,411*

Mission Science Value-Cost Savings from the Advanced Imaging Communication System (AICS) (Advanced Imaging Communication System).
N85-12905/4/GAR *515,283*

Digital Image Processing: Report from a Conference and Study Trip to the USA and Canada, Summer 1984.
N85-13153/0/GAR *514,821*

LANDSAT Instruments Characterization.
N85-13356/9/GAR *514,822*

Coastal Zone Color Scanner (CZCS): Imagery of Near-Surface Phytoplankton Pigment Concentrations from the First Coastal Ocean Dynamics Experiment (CODE-1), March - July 1981.
N85-13447/6/GAR *514,733*

Restoration of Multichannel Microwave Radiometric Images.
N85-13527/5/GAR *514,830*

Automatic Analysis of Speckle Photographs by Microcomputer.
PB85-136378/GAR *515,235*

IMAGE RESTORATION
Restoration of Multichannel Microwave Radiometric Images.
N85-13527/5/GAR *514,830*

IMAGING TECHNIQUES
Restoration of Multichannel Microwave Radiometric Images.
N85-13527/5/GAR *514,830*

IMMERSION PLATING
Protective Coatings: Immersion Plating, 1966-February 1985 (Citations from the Metals Abstracts Data Base).
PB85-864842/GAR *514,968*

IMMUNOLOGIC DISEASES
Reports on AIDS (Acquired Immunodeficiency Syndrome) Published in the Morbidity and Mortality Weekly Report, June 1981 through January 1985.
PB85-162139/GAR *514,599*

IMPACT ACCELERATION
Biomechanical Studies of Impact Acceleration Research.
AD-A149 077/0/GAR *514,665*

IMPACT STRENGTH
Tough Composite Materials.
N85-12941/9/GAR *514,973*

IMPACT TESTING MACHINES
Instrumented Impact Testing Machine with Reduced Specimen Oscillation Effects.
N85-13218/1/GAR *515,227*

IMPACT TESTS
Comparison of Structural Computer Programs Used for the Analysis of Spent Fuel Shipping Casks.
DE85002444/GAR *515,385*

Full-Scale Crash-Test Evaluation of Two Load-Limiting Subfloors for General Aviation Airframes.
N85-13267/8/GAR *514,338*

IMPURITIES
Sodium Chemistry in the MEL In-Sodium Creep Facilities.
PB85-143139/GAR *515,237*

IN-SITU COMBUSTION
Method for Controlled Burnout of Abandoned Coal Mines and Waste Banks.
PATENT-4 387 655 *514,923*

INCINERATORS
Reliability, Availability, and Maintainability of the Heat Recovery Incinerator at Naval Air Station , Jacksonville.
AD-A148 584/0/GAR *515,057*

INCOME
Military and Civilian Lifetime Earnings Comparisons.
AD-A148 844/4/GAR *514,458*

INCOMPRESSIBLE FLOW
Richardson Number Criterion for the Nonlinear Stability of Three-Dimensional Stratified Flow.
AD-A148 971/5/GAR *515,528*

INDEXES (DOCUMENTATION)
Compendium of the Substantive Resource Development Materials of the Plan Documents File.
HRP-0905992/4/GAR *514,445*

INDIAN SPACE PROGRAM
Colloquium About Joint Projects within DFVLR/ISRO(Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt/Indian Space Research Organization, Bangalore, Satellite Centre) Cooperation.
N85-12907/0/GAR *515,703*

INDIVIDUAL PROGRESS
Private Sector: Ethnicity, Individual Initiative, and Economic Growth in an African Plural Society. The Bamileke of Cameroon.
PB85-140192/GAR *514,552*

INDONESIA
Indonesia - Energy Situation 1982/83.
DE84770487/GAR *514,886*

INDOOR AIR POLLUTION
Asbestos: Expedience, Exposure, and Human Experiance.
HRP-0906074/0/GAR *514,617*

INDUSTRIAL HYGIENE
Primer of Occupational and Environmental Medicine: A Manual for Family Physicians and Other Primary Care Physicians.
HRP-0906070/8/GAR *514,616*

Asbestos: Expedience, Exposure, and Human Experiance.
HRP-0906074/0/GAR *514,617*

Hazards to Women in the Workplace.
HRP-0906079/9/GAR *514,618*

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PB85-854792/GAR *515,252*

Coal Tar Hazards. 1976-February 1985 (Citations from the Energy Data Base).
PB85-855302/GAR *514,621*

INDUSTRIAL MANAGEMENT
L'Analyse de la Valeur (Value Analysis).
N85-13684/4/GAR *514,463*

UK (United Kingdom) Industrial Energy Demand: Economic and Technical Change in the Steam Boiler Stock.
PB85-144293/GAR *514,948*

INDUSTRIAL MEDICINE
Physician Evaluation of Impairment/Disability.
HRP-0906093/0/GAR *514,619*

INDUSTRIAL PLANTS
Environmental Assessment of Industrial Process Energy Conservation Measures. Final Report.
DE85000186/GAR *514,895*

INDUSTRIAL WASTE TREATMENT
Ponding of Effluents from Fossil Fuel Steam Electric Power Plants.
PB85-144244/GAR *515,106*

INDUSTRIAL WASTES
Combustion of Industrial Waste Gases, Residual and Waste Liquids and Fluids.
DE84770478/GAR *514,986*

Analytical Reference Standards and Supplemental Data: The Pesticides and Industrial Chemicals Repository.
PB85-143766/GAR *514,714*

INDUSTRIALIZATION
Private Sector: Costa Rica.
PB85-141679/GAR *514,479*

INDUSTRIES
Military Industrial Complex: A Discussion of Selected Issues.
AD-A148 873/3/GAR *514,494*

Technology and Management Needs of Small and Medium Agro-Industrial Enterprises in Kenya: Implications for an International Agro-Industrial Service Center,
PB85-143071/GAR *514,354*

INELASTIC COLLISIONS
Energieuebertraege bei Atom-Molekuel-Streuexperimenten AM Beispiel der Systeme SF6-AR, CF4-Ne und Xe-CO2 im I 1 Ev-Bereich (Energy Transfer in Atom-Molecule Scattering Experiments in the 1EV Region with SF6-AR, CF4-Ne and Xe-CO2 Systems as Examples).
N85-13588/7/GAR *514,708*

INEQUALITIES
Inequalities for the M/G/Infinity Queue and Related Shot Noise Processes.
AD-A149 015/0/GAR *515,052*

INFANTS
Improving Infant Nutrition, Health and Survival: Policy and Program Implications from the Malaysian Family Life Survey.
PB85-141653/GAR *514,607*

INFORMATION
Post-Processing of Bibliographic Citations from DOE/RECON, NASA/RECON, and DOD/DROLS. Revision 1.
DE85000617/GAR *514,443*

INFORMATION CENTERS
Sourcebook: Gaining Access to US Government Information on the Environment and Natural Resources.
DE84017419/GAR *514,442*

INFORMATION DISSEMINATION
ASEE-NASA Summer Faculty Fellowship Program (Aeronautics and Research), 1984.
N85-13664/6/GAR *514,431*

Fy 1984 Scientific and Technical Reports, Articles, Papers and Presentations.
N85-13670/3/GAR *514,448*

Un Systeme de Documentation Electronique (An Electronic Documentation System).
N85-13683/6/GAR *514,449*

INFORMATION EXCHANGE
Study of the Requirements of an Electronic Message Handling Facility.
AD-A149 087/9/GAR *514,819*

INFORMATION MANAGEMENT
ASEE-NASA Summer Faculty Fellowship Program (Aeronautics and Research), 1984.
N85-13664/6/GAR *514,431*

INFORMATION RETRIEVAL
Fy 1984 Scientific and Technical Reports, Articles, Papers and Presentations.
N85-13670/3/GAR *514,448*

INFORMATION SYSTEMS
Study of the Requirements of an Electronic Message Handling Facility.
AD-A149 087/9/GAR *514,819*

Sourcebook: Gaining Access to US Government Information on the Environment and Natural Resources.
DE84017419/GAR *514,442*

Activities Report in Technology.
N85-13681/0/GAR *514,432*

National Fire Incident Reporting System (NFIRS) Data Base (1983 Equipment/Casualty File).
PB85-132207/GAR *515,184*

National Fire Incident Reporting System (NFIRS) Data Base (1983 Master File).
PB85-132215/GAR *515,185*

National Fire Incident Reporting Systems (NFIRS) Data Base (1983 Incident File).
PB85-132231/GAR *515,186*

INFORMATION THEORY
Limitantes DA Equivocacao Em Canais Gaussianos Aditivos (Equivocation Limits in Gaussian Additive Channels).
N85-13137/3/GAR *514,658*

INFRARED ABSORPTION
Development of Acceptance Criteria for Batches of Silane Primer for External Tank Thermal Protection System Bonding Applications.
N85-13043/3/GAR *514,681*

INFRARED COUNTERMEASURES
Extracts from Symposium Countersurveillance '83 Held at Melbourne, Australia on 27 and 28 April, 1983.
AD-A149 066/1/GAR *515,299*

INFRARED DETECTORS
Elimination of Sensor Artifacts from Infrared Data.
AD-A149 048/1/GAR *515,298*

Chinese Journal of Infrared Research (Selected Articles)--Translation.
AD-A149 059/8/GAR *515,199*

INFRARED SPECTRA
Development of Acceptance Criteria for Batches of Silane Primer for External Tank Thermal Protection System Bonding Applications.
N85-13043/3/GAR *514,681*

INFRARED SPECTROSCOPY
Orientation of Hydroquinone and Benzoquinone Adsorbed on Platinum Electrodes: Studies by Reflection-Adsorption Infrared Spectroscopy.
AD-A149 011/9/GAR *514,688*

Development of Acceptance Criteria for Batches of Silane Primer for External Tank Thermal Protection System Bonding Applications.

N85-13043/3/GAR 514,681

INFRARED THERMOGRAPHY
Infrared-Thermal Wave Scanner for NDE of Naval Thermal Spray Coatings.
DE85002237/GAR 515,205

INFUSION PUMPS
Health Equipment Information Number 125, September 1984 (Evaluation Issue).
PB85-135580/GAR 514,624

INHALATION
Inhalation Toxicity of Manganese Dioxide and a Magnesium Oxide-Manganese Dioxide Mixture.
AD-A148 868/3/GAR 514,867

INJECTION MOLDING
Optimisation de l'injection des Thermoplastiques Thermostables Peek Renforces de Fibres Courtes de Carbone (Optimization of the Injection Process for Thermostatic Polyether-Ether-Ketone (Peek) Thermoplastics Reinforced with Short Carbon Fibers).
N85-13062/3/GAR 515,013

New Markets Through Improved Performance, Reinforced Thermoset Injection International Conference Held at the Library Theatre, Solihull on October 9-10, 1984.
PB85-144210/GAR 515,158

Reaction Injection Molding, 1970-February 1985 (Citations from the U. S. Patent Data Base).
PB85-855419/GAR 515,161

INLET AIRFRAME CONFIGURATIONS
Flight and Wind-Tunnel Comparisons of the Inlet-Airframe Interaction of the F-15 Airplane.
N85-12884/1/GAR 514,334

INSECT CONTROL
Ovipositional Stimulant for Trichogramma Spp.
PATENT-4 484 539 514,602

INSPECTION
Electromagnetic Inspection of Wire Ropes Using Sensor Arrays.
AD-A149 016/8/GAR 514,985

Pulsed Photothermal Radiometry for Remote Sensing of Spectroscopic and Physical Properties of Thin Film.
AD-A149 080/4/GAR 515,200

Procedures for Precap Visual Inspection.
N85-13156/3/GAR 515,149

INSTRUCTIONS
Guide to Health Planning Law: A Topical Digest of Health Planning and Certificate of Need Case Law,
HRP-0905965/0/GAR 514,584

INSTRUMENT APPROACH
Realistic Localizer Courses for Aircraft Instrument Landing Simulators.
N85-12885/8/GAR 514,531

INSTRUMENT LANDING SYSTEMS
Realistic Localizer Courses for Aircraft Instrument Landing Simulators.
N85-12885/8/GAR 514,531

INSTRUMENT ORIENTATION
Design, Fabrication and Delivery of a Spacelab Neutral Buoyancy Instrument Pointing System (IPS) Mockup.
N85-12934/4/GAR 514,532

INTEGERS
Formats for Numerical and Textual Data in Data Processing.
N85-13504/4/GAR 514,826

INTEGRAL EQUATIONS
Loeb Sobolev Spaces with Applications to Variational Integrals and Differential Equations.
N85-13544/0/GAR 515,047

INTEGRALS
Unrestricted Convergence for Generalized Poisson Integrals.
N85-13540/8/GAR 515,043

INTEGRATED CIRCUITS
Very Large Scale Integration: Computer Aided Layout and Design. April 1983-January 1985 (Citations from the INSPEC: Information Services for the Physics and Engineering Communities Data Base).
PB85-855013/GAR 514,872

INTELSAT SATELLITES
Transmission de la Television en Modulation de Frequence (Television Transmission in Frequency Modulation).
N85-13148/4/GAR 515,285

INTENSIVE CARE UNITS
Intensive Care Units (ICU's): Clinical Outcomes, Costs, and Decisionmaking.
PB85-145928/GAR 514,628

INTERACTIVE GRAPHICS
I-PIGS: A Concurrent Programming Environment with Interactive Graphical Support,
PB85-140846/GAR 514,836

INTERDICTION
Air-Land Battle Interdiction Model Corps Communications Module.
AD-A148 853/5/GAR 515,280

INTEREST RATE
Effects of Low Interest Rates on the Poor in Low Income Countries,
PB85-143014/GAR 514,353

INTERIOR BALLISTICS
Projectile Motion in a Flexible Gun Tube.
AD-A149 022/6/GAR 515,507

INTERMODULATION
Simulation d'Une Chaine de Transmission a Elements Faiblement Non Lineaires. Calcula des Produits d'Intermodulation sur UN Signal Compose de N Porteuses (Simulation of a Transmission Circuit Composed of Slightly Nonlinear Elements. Computation of the Intermodulation on Signals Composed of N Carriers).
N85-13167/0/GAR 514,859

INTERNATIONAL COOPERATION
Cooperation and Competition on the Path to Fusion Energy.
DE85002392/GAR 515,330

Colloquium About Joint Projects within DFVLR/ISRO(Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt/Indian Space Research Organization, Bangalore, Satellite Centre) Cooperation.
N85-12907/0/GAR 515,703

Les Systemes de Lancements (Launching Systems).
N85-12917/9/GAR 515,721

INTERNATIONAL FEDERATION OF OPERATIONAL RESEARCH SOCIETIES
IFORS (International Federation of Operational Research Societies) in Retrospect, IFORS Twenty-Fifth Anniversary Banquet Speech.
PB85-142974 515,056

INTERNATIONAL RELATIONS
Parameters, Journal of the US Army War College, Volume 14, Number 4, Winter 1984.
AD-A149 004/4/GAR 514,498

INTERNATIONAL STANDARD PROBLEM 13
International Standard Problem 13 (LOFT Experiment L2-5) Final Comparison Report.
NUREG/CR-4115/GAR 515,460

INTERNATIONAL TECHNOLOGY TRANSFER
International Transfer and Acquisition of Technology: Documentary Review,
PB85-147791/GAR 514,491

INTERNATIONAL TRADE
Agroindustries Investment and Trade Opportunities in Morocco,
PB85-143725/GAR 514,356

Reference Tables and Graphs for World Wheat Trade.
PB85-145027/GAR 514,359

U.S.-Flag Crosstrading. Volume 1. Executive Summary.
PB85-146553/GAR 514,488

U.S.-Flag Crosstrading. Volume 2. U.S.-Flag Crosstrading Operations and U.S. Policy Options.
PB85-146561/GAR 514,489

U.S.-Flag Crosstrading. Volume 3. Impediments to U.S.-Flag Crosstrading Operations.
PB85-146579/GAR 514,490

INTERPLANETARY SPACE
Interplanetary Radio Storms. 2: Emission Levels and Solar Wind Speed in the Range 0.05-0.8 AU.
N85-13761/0/GAR 514,400

INTERPOLATION
Interpolating Sequences for H to Infinity in the Ball.
N85-13542/4/GAR 515,045

INTERSTELLAR COMMUNICATION
Mission Interstellaire (Interstellar Mission).
N85-12916/1/GAR 515,705

INTERSTELLAR MATTER
Detection of Submillimeter Polarization in the Orion Nebula.
N85-13700/8/GAR 514,388

INTERSTELLAR SPACECRAFT
Mission Interstellaire (Interstellar Mission).
N85-12916/1/GAR 515,705

INTRAVEHICULAR ACTIVITY
Human Role in Space. Volume 1. Executive Summary.
N85-13473/2/GAR 515,709

INVERTEBRATES
Biological Methods for Determining Toxicity of Contaminated Freshwater Sediments to Invertebrates.
PB85-144103/GAR 514,672

Effects of Copper, Nickel and Zinc on the Life Cycle of the Caddisfly 'Clistoronia magnifica' (Limnephilidae).
PB85-144111/GAR 514,573

INVERTERS
Transistorized Inverter and Examples of Its Application,
PB85-149540/GAR 514,949

INVESTMENT
Regional Investment Strategies: Information and Analytical Tools.
PB85-144335/GAR 514,482

INVESTMENTS
Social Methodology for Community Participation in Local Investments: The Experience of Mexico's PIDER (Integrated Program for Rural Development) Program.
PB85-141604/GAR 514,475

Metodologia Social para la Participacion Comunitaria en las Inversiones Locales: La Experiencia del PIDER (Programa de Inversiones para el Desarrollo Rural) en Mexico (Social Methodology for Community Participation in Local Investments: The Experience of Mexico's PIDER Program).
PB85-141612/GAR 514,476

IO
Outer Satellite Atmospheres: Their Nature and Planetary Interactions.
N85-13759/4/GAR 514,398

IODINE
Determination of Iodine Specific Activity in Nuclear Fuel Reprocessing Plant off-Gases.
DE85000193/GAR 515,475

Iodine Sorption/Desorption from Low-Alloy Steel and Graphite. Draft.
DE85000966/GAR 515,477

IODINE 127
Determination of Iodine Specific Activity in Nuclear Fuel Reprocessing Plant off-Gases.
DE85000193/GAR 515,475

IODINE 129
Determination of Iodine Specific Activity in Nuclear Fuel Reprocessing Plant off-Gases.
DE85000193/GAR 515,475

ION BEAMS
Ion Beam Mixing: Basic Experiments.
DE85002763/GAR 515,560

Ion Beam Lithography.
N85-13219/9/GAR 515,151

ION EXCHANGE RESINS
Zeolites in Catalysis. June 1983-February 1985 (Citations from the Energy Data Base).
PB85-854826/GAR 515,677

IONIZATION
Oscillator Strengths for OII Ions.
N85-13558/0/GAR 514,706

IONOSPHERE
Contribuciones Cientificas Para Conmemorar El 75 Aniversario Del Observatorio Del Ebro (Scientific Contributions in Commemoration of Ebro Observatory's 75TH Anniversary).
N85-13308/0/GAR 514,406

IONS
Electrostriction and Dielectric Friction on Ions Moving through Compressible Polar Solvents.
PB85-151702 514,720

IRAN
Iran - Energy Situation 1983.
DE84770428/GAR 514,883

IRON
CO+ H Sub 2 Reaction over Nitrogen-Modified Iron Catalysts. Quarterly Technical Progress Report, April 1, 1984-June 30, 1984.
DE85000025/GAR 515,607

Studies of the Kinetics and Mechanisms of Ammonia Synthesis and Hydrodesulfurization on Metal Single Crystal Surfaces.
DE85001650/GAR 514,697

IRON ALLOYS
Stirling Material Technology.
N85-13007/8/GAR 515,692

IRON NITRIDES
CO+ H Sub 2 Reaction over Nitrogen-Modified Iron Catalysts. Quarterly Technical Progress Report, April 1, 1984-June 30, 1984.
DE85000025/GAR 515,607

IRON OXIDES
Advanced Fuel Cell Development. Progress Report, October-December 1983.
DE85000781/GAR 514,933

Organic Complexant-Enhanced Mobility of Toxic Elements in Low-Level Wastes.
DE85002375/GAR 515,410

IRRADIATION
Thermal Effects in Radiation Processing.
DE85002638/GAR 514,729

IRRADIATION PLANTS
Design, Manufacture, Test, and Delivery of 230 KV Extruded, Radiation Cross-Linked Polyethylene Cable: Design of 7 Megavolt Toroidal Irradiator; Fabrication and Testing of Model Cables. Final Report.
DE85000770/GAR 515,337

IRRIGATION
Circular Concrete Irrigation Turnout: Design and Construction. Handbook No. 1.
PB85-140218/GAR 514,369

ISLAM
Political Impact of Islam in Sudan: Numayri's Islamization Program.
AD-A148 958/2/GAR 514,507

ISRO
Colloquium About Joint Projects within DFVLR/ISRO(Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt/Indian Space Research Organization, Bangalore, Satellite Centre) Cooperation.
N85-12907/0/GAR 515,703

KEYWORD INDEX

ISX TOKAMAK
Fusion Energy Division (Oak Ridge National Laboratory) Annual Progress Report Period Ending December 31, 1983.
DE85001701/GAR *515,324*

ITERATION
Transformation of Two and Three-Dimensional Regions by Elliptic Systems.
N85-13529/1/GAR *515,041*

JET AIRCRAFT NOISE
Experimental Investigation of Shock-Cell Noise Reduction for Dual-Stream Nozzles in Simulated Flight.
N85-13549/9/GAR *515,687*

JET BLAST EFFECTS
Study of Flow Past an Airfoil with a Jet Issuing from Its Lower Surface.
N85-12860/1/GAR *514,316*

JET ENGINE FUELS
Liquid Phase Products and Solid Deposit Formation from Thermally Stressed Model Jet Fuels.
N85-13066/4/GAR *515,668*

Method for Evaluating Petrol Products Corrosivity Using Piezoelectric Crystals. Part 2: Instruction Manual.
N85-13073/7/GAR *515,669*

JET FIGHTERS
Evaluation of the Birdstrike Threat to the F-15 Present Fleet, Rapid Deployment Force, and Dual Role Fighter Transparencies.
AD-A148 954/1/GAR *514,331*

JET FLAPS
Study of Flow Past an Airfoil with a Jet Issuing from Its Lower Surface.
N85-12860/1/GAR *514,316*

JET FLOW
Aerodynamic Improvements by Discrete Wing Tip Jets.
AD-A148 981/4/GAR *514,314*

Etudes des Correlations Vitesse-Pression Acoustique Conditionnees sur le Signe et l'Amplitude de la Fluctuation de Vitesse dans UN Jet Froid (Study of the Velocity-Acoustic Pressure Correlation in a Cold Jet, Centered on the Sign and the Amplitude of the Velocity Fluctuations).
N85-13193/6/GAR *515,516*

Laminar Jet Issuing into Stagnant Surroundings.
N85-13200/9/GAR *515,538*

JET REACTORS
Joint JET ISX-B Beryllium Limiter Experiment. Monthly Newsletter, June 1984.
DE85002487/GAR *515,331*

JOB ANALYSIS
Computerized Manufacturing Automation: Employment, Education, and the Workplace. Volume 2. Working Papers. Part A: Case Studies on the Introduction of Programmable Automation in Manufacturing; Work Environment Effects. Part B: Final Report: Education and Training Case Study Series.
PB85-136824/GAR *515,155*

Computerized Manufacturing Automation: Employment, Education, and the Workplace. Volume 2. Working Papers. Part C: Individual Education and Training Case Studies.
PB85-136832/GAR *515,156*

JOB CREATION
Labor Markets and Industry in Egypt: Analysis and Recommendations for Employment Oriented Growth,
PB85-136966/GAR *514,466*

JOINT MILITARY ACTIVITIES
AirLand Battle Execution -- Some Implications of Deep Attack.
AD-A148 948/3/GAR *515,269*

JOINTS
Leakage-Flow-Induced Vibration of a Tube-in-Tube Slip Joint.
DE84007301/GAR *515,427*

JUDICIAL DECISIONS
Transportation Initial Decisions and Orders and Board Opinions and Orders Adopted and Issued during the Month of February, 1984.
PB84-916702/GAR *514,501*

Transportation Initial Decisions and Orders and Board Opinions and Orders Adopted and Issued during the Month of March, 1984.
PB84-916703/GAR *514,502*

Transportation Initial Decisions and Orders and Board Opinions and Orders Adopted and Issued during the Month of April, 1984.
PB84-916704/GAR *514,503*

KALMAN FILTERING
Robust Kalman Filtering and Its Applications.
AD-A149 044/0/GAR *515,025*

KALMAN FILTERS
Kalman Filters, November 1982-February 1985 (Citations from the Engineering Index Data Base).
PB85-855054/GAR *515,048*

KAOLINITE
Organic Complexant-Enhanced Mobility of Toxic Elements in Low-Level Wastes.
DE85002375/GAR *515,410*

KENYA
Evaluation of Birth Histories: A Case Study of Kenya.
PB85-141844/GAR *514,555*

Technology and Management Needs of Small and Medium Agro-Industrial Enterprises in Kenya: Implications for an International Agro-Industrial Service Center,
PB85-143071/GAR *514,354*

KERR MAGNETOOPTICAL EFFECT
Obturateur a Effet Kerr Optique. Rapport de Synthese Finale (Obturator with Optic Kerr Effect. Final Report),
PB85-137289/GAR *514,711*

KILL PROBABILITIES
Guidelines for Predicting the Effects of Underwater Explosions on Swimbladder Fish.
AD-A148 870/9/GAR *515,505*

Methodology for the Determination of Rotary Wing Aircraft Vulnerabilities in Air-to-Air Combat Simulation.
AD-A148 984/8/GAR *514,328*

KINETIC FRICTION
Turbine Blade Damping Study.
N85-12890/8/GAR *515,683*

KLEBSIELLA
'Klebsiella' Occurrence, Significance and Detection in Water Systems: A Progress Report,
PB85-144160/GAR *514,636*

KNOWLEDGE BASED SYSTEMS
Design of a Knowledge-Based Fault Detection and Diagnosis System,
AD-A148 859/2/GAR *514,422*

Predicting the Performance of Distributed Knowledge-Based Systems: A Modeling Approach,
AD-A149 021/8/GAR *514,427*

Expert Computer Systems. February 1984-January 1985 (Citations from the INSPEC: Information Services for the Physics and Engineering Communities Data Base).
PB85-855401/GAR *514,847*

KOREA
Economic Development of Korea: Sui Generis or Generic.
PB85-136760/GAR *514,465*

KRYPTON 85
Krypton-85 Health Risk Assessment for a Nuclear Fuel Reprocessing Plant.
DE85000838/GAR *514,615*

LABOR FORCE
Technical Change in a Newly Industrializing Country: A Case Study of the Impacts on Employment and Skills in the Brazilian Textiles Industry.
PB85-143733/GAR *514,537*

LABOR MARKET
Labor Markets and Industry in Egypt: Analysis and Recommendations for Employment Oriented Growth,
PB85-136966/GAR *514,466*

LABORATORIES
Acoustical Laboratory Accreditation Program of the United States.
PB85-151694 *515,517*

LABORATORY ANIMALS
Biomechanical Studies of Impact Acceleration Research.
AD-A149 077/0/GAR *514,665*

LABORATORY EQUIPMENT
Multi-Layer Coil Countercurrent Chromatograph with Adjustable Revolutional Radius.
PATENT-4 487 693 *515,234*

LACROSSE VIRUS
Mechanisms of Bunyavirus Virulence: A Genetic Approach.
AD-A149 058/0/GAR *514,635*

LADLES
Steel Pouring Ladle Liners: Refractory Service Life. 1966-February 1984 (Citations from the Metals Abstracts Data Base).
PB85-855203/GAR *514,964*

Steel Pouring Ladle Liners: Refractory Service Life. March 1984-February 1985 (Citations from the Metals Abstracts Data Base).
PB85-855211/GAR *514,965*

LAKES
Field Experiment Determinations of Distribution Coefficients of Actinide Elements in Sulfate Lake Environments.
NUREG/CR-4094/GAR *515,341*

LAMINAR FLOW
Natural Laminar Flow Airfoil Design Considerations for Winglets on Low-Speed Airplanes.
N85-12863/5/GAR *514,319*

Laminar Jet Issuing into Stagnant Surroundings.
N85-13200/9/GAR *515,538*

LAMINATES
Comprehensive Study on Sublaminate Crack Growth Stability and Its Effects on the Load-Carrying Capacity.
AD-A149 037/4/GAR *514,971*

Tough Composite Materials.
N85-12941/9/GAR *514,979*

LAND DISPOSAL
Land Treatment of Petroleum Refinery Sludges.
PB85-148706/GAR *515,112*

LAND REFORM
Landless Workers and Rice Farmers: Peasant Subclasses Under Agrarian Reform in Two Philippine Villages,
PB85-142644/GAR *514,351*

LANDING SIMULATION
Realistic Localizer Courses for Aircraft Instrument Landing Simulators.
N85-12885/8/GAR *514,531*

LARGE COIL PROGRAM
Startup of Large Coil Test Facility.
DE85001669/GAR *514,789*

LARGE SPACE STRUCTURES
Definition of Technology Development Missions for Early Space Station Satellite Servicing. Volume 1. Executive Summary.
N85-12922/9/GAR *515,707*

Definition of Technology Development Missions for Early Space Station Satellite Servicing. Volume 2. Technical.
N85-12923/7/GAR *515,708*

Conceptual Design for Scaled Truss Antenna Flight Experiment.
N85-12932/8/GAR *515,717*

LASER APPLICATIONS
Laser for Determining the Ignition Conditions of a Pyrotechnic Mixture.
N85-13230/6/GAR *515,598*

LASER BEAMS
Atmospheric Effects on Laser Beams. 1975-February 1985 (Citations from the NTIS Data Base).
PB85-855104/GAR *514,409*

LASER DOPPLER VELOCIMETERS
Etude Par Anemometrie Laser d'Ecoulements Decolles sur des Profils d'Aile (Laser Anemometer Study of Separated Flow on Wing Profiles).
N85-12872/6/GAR *514,324*

Experimental Investigation of Two-Dimensional Thrust Augmenting Ejectors, Part 2.
N85-12895/7/GAR *515,685*

LASER FUSION REACTORS
Comparison of Three ICF Reactor Designs.
DE85001211/GAR *515,320*

LASER HEATING
Interfaces under Laser Irradiation,
PB85-143246/GAR *515,524*

LASER IMPLOSIONS
Use of the ORACLE DBMS in Determining the Response of Complex Scientific Instrumentation.
DE85001742/GAR *515,328*

LASER INDUCED FUSION
Raman Sidescattering in Laser-Produced Plasmas.
AD-A148 905/3/GAR *515,569*

LASER INTERFEROMETRY
Improved Sensitivities in Laser Interferometers for the Detection of Gravitational Waves.
N85-13232/2/GAR *515,574*

LASER ISOTOPE SEPARATION
Review of AVLIS Technology for Production-Scale LIS Systems and Construction.
DE85002002/GAR *515,338*

LASER PLASMA INTERACTIONS
Focusing Effects of a Laser Beam in the Nonresonant Multiphoton Ionization MPI(Multiphoton Ionization) of Gases.
N85-13231/4/GAR *515,573*

LASER-PRODUCED PLASMA
Raman Sidescattering in Laser-Produced Plasmas.
AD-A148 905/3/GAR *515,569*

Laser Program Annual Report 1983.
DE84017287/GAR *515,311*

LASER SPECTROSCOPY
Velocity-Changing Collisional Effects in Nonlinear Atomic Spectroscopy and Photon Echo Decay in Gases.
N85-13559/8/GAR *514,707*

Dynamic Stark-Effect in Thallium,
PB85-143204/GAR *514,712*

LASER TARGETS
Laser Program Annual Report 1983.
DE84017287/GAR *515,311*

Applications of Pulsed-Laser Techniques and Thermographic Phosphors to Dynamic Thermometry of Rotating Surfaces.
DE85000403/GAR *515,202*

LATHES
Conduite d'Une Cellule Flexible d'Usinage (Design of a Flexible Machining System).
N85-13252/0/GAR *515,152*

LATTICE FIELD THEORY
Deconfining Transitions in 2+ 1 Dimensional SU(3) and SU(4) Gauge Theories,
PB85-139764/GAR *515,575*

Scales of Deconfinement,
PB85-139772/GAR *515,567*

LAX-WENDROFF SCHEMES
Generalized Formulation of TVD (Total Variation Diminution) Lax-Wendroff Schemes.
N85-13528/3/GAR *515,040*

LEAD 210
Radioecological Investigations of Uranium Mill Tailings Systems. Fifth Technical Progress Report, October 1, 1983-September 30, 1984.
DE85000005/GAR *515,422*

LEAD ZIRCONATE TITANATE
Effect of Powder Characteristics on Microstructure and Properties in Alkoxide Prepared PZT Ceramics.
AD-A149 082/0/GAR *514,958*

LEADERSHIP
Ethics and the Army Officer: An Assessment and Recommendations for the Future.
AD-A148 949/1/GAR *514,517*

Leadership: Structural and Functional Aspects.
AD-A149 096/0/GAR *514,547*

LEADERSHIP TRAINING
Training Objectives for Tank Platoon Leaders: A Focus Group Evaluation.
AD-A148 910/3/GAR *514,543*

Leadership Development in the Civilian Work Force.
AD-A148 955/8/GAR *514,518*

LEAKAGE
Qualificazione di Sistemi Non-Invasivi Per la Rivelazione on-Line di Perdite in Preriscaldatori d'Acqua Alimento AD Alta Pressione (Qualification of Noninvasive Systems for on-Line Leak Detection in High Pressure Feed Water Preheaters).
N85-13555/6/GAR *515,230*

LECTURES
E. C. Meyer, General, United States Army, Chief of Staff, June 1979-June 1983.
AD-A149 006/9/GAR *514,520*

LEGISLATION
Information Report on State Legislation, Vol. 10, No. 7, December 1984.
NUREG/BR-0025-85/01/GAR *514,499*

LEGUMINOUS PLANTS
Pigeonpeas (Cajanus cajan Millisp.): A Valuable Crop of the Tropics.
PB85-143105/GAR *514,375*

LEISHMANIA
Mode of Action of Polyamine Analogues on the Growth and Biochemistry of Leishmanial Cells.
AD-A148 857/6/GAR *514,637*

LI-DRIFTED SI DETECTORS
Calculation of Si(Li) X-Ray Detector Efficiencies.
DE85002732/GAR *515,211*

LIFE-CYCLE COST
Recommendations for Energy Conservation Standards and Guidelines for New Commercial Buildings. Volume III. Description of the Test Process. Appendix C: Life-Cycle Code Documentation.
DE85003152/GAR *514,917*

LIFE CYCLE COSTS
Technologies for Space Station Autonomy.
N85-12906/2/GAR *515,713*

LIFE (DURABILITY)
Surveillance des Machines (The Monitoring of Machines).
N85-13253/8/GAR *515,167*

LIFE EXPECTANCY (SERVICE LIFE)
Conference Proceedings of Engine Cyclic Durability by Analysis and Testing.
AD-A149 028/3/GAR *515,680*

LIFT
Assessment of Muscle Strength and Prediction of Lifting Capacity in U.S. Army Personnel,
AD-A148 848/9/GAR *514,659*

Comparison of Wortmann Airfoil Computer-Generated Lift and Drag Polars with Flight and Wind Tunnel Results.
N85-12868/4/GAR *514,321*

LIGHT AMPLIFIERS
Analysis of Single-Mode Evanescent-Field-Pumped Dye Amplifier,
PB85-143236/GAR *515,547*

LIGHT DUTY VEHICLES
Application for Certification 1985 Model Year Light-Duty Vehicles - American Motors Corporation - Renault.
PB85-136513/GAR *515,130*

Application for Certification 1985 Model Year Light-Duty Vehicles - BMW AG.
PB85-136521/GAR *515,131*

Application for Certification 1985 Model Year Light-Duty Vehicles - Chrysler.
PB85-136539/GAR *515,132*

Application for Certification 1985 Model Year Light-Duty Vehicles - General Motors.
PB85-136547/GAR *515,133*

Application for Certification 1985 Model Year Light-Duty Vehicles - Mazda.
PB85-136554/GAR *515,134*

Application for Certification 1985 Model Year Light-Duty Vehicles - Mercedes-Benz.
PB85-136562/GAR *515,135*

Application for Certification 1985 Model Year Light-Duty Vehicles - Mitsubishi.
PB85-136570/GAR *515,136*

Application for Certification 1985 Model Year Light-Duty Vehicles - Nissan.
PB85-136588/GAR *515,137*

Application for Certification 1985 Model Year Light-Duty Vehicles - Peugeot.
PB85-136596/GAR *515,138*

Application for Certification 1985 Model Year Light-Duty Vehicles - Saab-Scania.
PB85-136604/GAR *515,139*

Application for Certification 1985 Model Year Light-Duty Vehicles - Toyota.
PB85-136612/GAR *515,140*

Application for Certification 1985 Model Year Light-Duty Vehicles - Volkswagen-Audi.
PB85-136620/GAR *515,141*

LIGHT MODULATORS
Electro-Optic Spatial Light Modulator for Thermo-Elastic Generation of Programmably Focused Ultrasound.
AD-A149 078/8/GAR *515,550*

LIGHT NUCLEI
Time-of-Flight Isochronous (TOFI) Spectrometer for Direct Mass Measurements of Exotic Light Nuclei.
DE85002050/GAR *515,352*

LIGHT SCATTERING
Raman Sidescattering in Laser-Produced Plasmas.
AD-A148 905/3/GAR *515,569*

LIGHT TRANSMISSION
Diffraction Diffusion Screen with Holographically-Suppressed Zero-Order Beam.
PAT-APPL-6-667 194/GAR *515,551*

LIGHT WATER REACTORS
Windows for Innovation: A Story of Two Large-Scale Technologies,
PB85-150340/GAR *515,294*

LIGHTNING
Essais de Susceptibilite a Une Agression Electromagnetique (Tests for Susceptibility to Electromagnetic Attack).
N85-13154/8/GAR *515,345*

Improvement of Lightning Arresters Energy Capability.
N85-13172/0/GAR *514,794*

LIGNITE
Aerosol Formation from Pulverized Coal Combustion. Quarterly Reports 1, 2 and 3.
DE85003188/GAR *515,667*

Importance of Active Sites for Char Gasification in Oxygen (Air) and Carbon Dioxide.
PB85-155984/GAR *515,673*

LIMESTONE
Design Report on the Atmospheric Fluidized Bed Combustor at the Kentucky Center for Energy Research Laboratory,
PB85-138915/GAR *515,092*

LIMITERS
Sputtering Performance of the TFCX Limiter.
DE85000779/GAR *515,316*

Joint JET ISX-B Beryllium Limiter Experiment. Monthly Newsletter, June 1984.
DE85002487/GAR *515,331*

First-Wall and Limiter Conditioning in TFTR.
DE85002714/GAR *515,336*

LINE SCANNING
Filter Reflection Image Guide Oscillator and Solid State Line Scanning Device.
PAT-APPL-6-679 970/GAR *514,865*

LINEAR PROGRAMMING
Efficient Algorithm for Fuzzy Linear Programming with Multiple Objectives.
AD-A149 012/7/GAR *515,051*

LININGS
Comparison of Nomex and Evolution 3 for Use in Tent Liners.
AD-A149 057/2/GAR *514,984*

Steel Pouring Ladle Liners: Refractory Service Life. 1966-February 1984 (Citations from the Metals Abstracts Data Base).
PB85-855203/GAR *514,964*

Steel Pouring Ladle Liners: Refractory Service Life. March 1984-February 1985 (Citations from the Metals Abstracts Data Base).
PB85-855211/GAR *514,965*

LIPOPOLYSACCHARIDES
Expression of Lipopolysaccharide O Antigen in Escherichia coli K-12 Hybrids Containing Plasmid and Chromosomal Genes from Shigella dysenteriae 1.
AD-A148 942/6/GAR *514,580*

LIQUID CHROMATOGRAPHY
Development of Acceptance Criteria for Batches of Silane Primer for External Tank Thermal Protection System Bonding Applications.
N85-13043/3/GAR *514,681*

LIQUID CRYSTAL DISPLAY SYSTEMS
Color-Liquid-Crystal Display for Automotive Instrument Panel,
PB85-149557/GAR *515,142*

LIQUID CRYSTALS
Investigation and Development of Multicolored Liquid Crystal Display Systems for Automotive Dashboard Application and Large Format Information Boards.
N85-13652/1/GAR *515,128*

LIQUID FLOW
Magnetic Inductive Flowmeter for Low Conducting Liquids.
N85-13216/5/GAR *515,225*

LIQUID GUN PROPELLANTS
Application of Monte Carlo and Molecular Dynamics Methods to the Calculation of Thermodynamic Properties of Molten Salts.
AD-A148 897/2/GAR *515,491*

LIQUID PROPELLANT ROCKET ENGINES
Safety Aspects of Prepackaged Liquid Propellant Stages for Strategic Missiles,
AD-P004 350/5/GAR *515,702*

LIQUID SODIUM
Sodium Chemistry in the MEL In-Sodium Creep Facilities,
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LIQUID WASTE DISPOSAL
Fail-Safe Devices for the Prevention of Hazardous Material Spills.
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LITHIUM OXIDES
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Ion Beam Lithography.
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LITHOSPHERE
Lithospheric Structure in the Pacific Geoid.
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LITTLE BOY
Neutron and gamma-Ray Dose Measurements at Various Distances from the Little Boy Replica.
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LIVESTOCK
Production, Storage and Feeding of Herbaceous Forages to Support Ruminant Livestock in Developing Countries of the Tropics and Subtropics.
PB85-143089/GAR *514,374*

LMFBR TYPE REACTORS
Comparison of L04, L05, and L07: Three Irradiated 7-Pin Bundle TUCOP Tests.
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Methodology for Validation of Safety Parameters and Fault Identification.
DE84014685/GAR *515,431*

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DE84014730/GAR *515,421*

Analytical Formula for Fuel Particle to Liquid Sodium Heat Transfer.
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PFR/TREAT Program: Objectives, Accomplishments, and Plans.
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Integral Fast Reactor Concept.
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DE84017212/GAR *515,474*

Modeling of Core Debris-Sodium-Concrete Interactions.
DE85000076/GAR *515,375*

Bubble-Induced Mixing of Two Horizontal Liquid Layers with Non-Uniform Gas Injection at the Bottom.
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Application of the Pulsed Magnetic Welding Process to Nuclear Breeder Reactor Fuel Pin End Closures.
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LOSS OF FLOW
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Analytical Formula for Fuel Particle to Liquid Sodium Heat Transfer.
DE84014734/GAR 515,432

LOW CARBON STEELS
Nondestructive Evaluation of Residual Stress in Low-Carbon Steel.
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LOW INCOME GROUPS
Options for Coordinating Low-Income Fuel Assistance with Weatherization and Conservation Services.
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LOW INCOME HOUSING
Housing and Health: An Analysis for Use in the Planning, Design, and Evaluation of Low-Income Housing Programs.
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LOW-LEVEL RADIOACTIVE WASTES
Engineered Sorbent Barriers for Low-Level Waste.
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LOW SPEED WIND TUNNELS
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LUBRICANTS
Effect of Lubricant Extreme-Pressure Additives on Surface Fatigue Life of AISI 9310 Spur Gears.
N85-13234/8/GAR 515,166

LUBRICATING OILS
Effect of Two Inner-Ring Oil-Flow Distribution Schemes on the Operating Characteristics of a 35 Millimeter Bore Ball Bearing to 2.5 Million Dn.
N85-13233/0/GAR 515,165

LUNAR EVOLUTION
Conference on the Origin of the Moon.
N85-13709/9/GAR 514,396

LUNAR EXPLORATION
Mission Science Value-Cost Savings from the Advanced Imaging Communication System (AICS) (Advanced Imaging Communication System).
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LUNGS
Effect of Ventilation and Perfusion Imbalance on Inert Gas Rebreathing Variables.
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MACERALS
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MACHINES
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MACROECONOMICS
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PB85-139228/GAR 514,467

Mauritania: Rural Assessment and Manpower Surveys. Macro-Economic Simulation Model for Assessing Development Priorities.
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MAGNESIUM CHLORIDES
Use of ATP-MgCl2 in the Treatment of Injury and Shock.
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MAGNET COILS
Integrated-Blanket-Coil (IBC) Concept Applied to the Poloidal Field and Blanket Systems of a Tokamak Reactor.
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MAGNETIC ANOMALIES
Petrologic Model of the Northern Mississippi Embayment Based on Satellite Magnetic and Ground Based Geophysical Data.
N85-13406/2/GAR 514,746

MAGNETIC FIELDS
Ohm's Law for Mean Magnetic Fields.
DE85002706/GAR 515,526

3D Field Calculation of the GEM Prototype Magnet and Comparison with Measurements.
DE85003040/GAR 515,561

Ion Thruster Performance Model.
N85-12935/1/GAR 515,602

MAGNETIC MIRROR TYPE REACTORS
Remote Handling Requirements and Considerations for D-T Fusion Reactors.
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MAGNETIZATION
Petrologic Model of the Northern Mississippi Embayment Based on Satellite Magnetic and Ground Based Geophysical Data.
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MAGNETOHYDRODYNAMIC FLOW
Magnetohydrodynamic and Gasdynamic Theories for Planetary Bow Waves.
N85-13760/2/GAR 514,399

MAGNETOPAUSE
Reduction and Analysis of Data from the Plasma Wave Instruments on the IMP-6 and IMP-8 Spacecraft.
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MAGNETOSTATICS
Improved Magnetic Bias and Delay Linearity in a Magnetostatic Wave Delay Line.
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MAINTENANCE MANAGEMENT
Development, Use and Control of Maintenance Procedures in Nuclear Power Plants: Problems and Recommendations.
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MALAWI
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MALAYSIA
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MALIGNANT NEOPLASMS
Postoperative Adjuvant Therapy of Breast Cancer.
PB84-922808/GAR 514,587

MAN COMPUTER INTERFACE
Sector Suite Man/Machine Functional Capabilities and Performance Requirements.
AD-A148 881/6/GAR 514,803

Man-Machine Interaction: Operator.
AD-A149 075/4/GAR 514,817

MAN MACHINE SYSTEMS
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Simplified Grasping and Manipulation with Dextrous Robot Hands.
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Evaluation of Automated Decisionmaking Methodologies and Development of an Integrated Robotic System Simulation.
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MANPOWER
Department of Defense Civilian Manpower Statistics.
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MAPS

Index to Published Geologic Maps in the Region around the Potential Yucca Mountain Nuclear Waste Repository Site, Southern Nye County, Nevada.
DE85000260/GAR 515,389

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MARGINAL ICE ZONE

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MARKETS

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MARKOV CHAINS

Regenerative Structure of Markov Chains Simulated via Common Random Numbers.
AD-A149 092/9/GAR 515,033

MARKOV PROCESSES

Regenerative Structure of Markov Chains Simulated via Common Random Numbers.
AD-A149 092/9/GAR 515,033

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Pilot of the Modern Army Record-Keeping System (MARKS) at 5th Battalion, 73rd Armored Regiment, 194th Armored Brigade, Fort Knox, Kentucky.
AD-A148 974/9/GAR 514,519

MARS ATMOSPHERE

Mars Dust Sample Return Mission.
N85-12915/3/GAR 515,704

MARS (PLANET)

Mars Polar Volatiles: Topographic and Geologic Setting.
N85-13706/1/GAR 514,395

MARS PROBES

Mars Dust Sample Return Mission.
N85-12915/3/GAR 515,704

MARS REACTOR

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MASKS

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N85-13168/8/GAR 515,150

MASS TRANSFER

Proposal for Wall Function for Friction and Heat Transfer in the Presence of Roughness and Mass Transfer.
N85-13198/5/GAR 515,537

MATERIAL FORMING

Process Modeling Applied to Metal Forming and Thermomechanical Processing.
AD-A149 027/5/GAR 515,146

MATERIALS RECOVERY

Waste Water Pollution Management and Control in the Petrochemical and Plastics Processing Industry,
PB85-145043/GAR 515,005

Recovery and Recycling of Tin in Tinplate Plant,
PB85-145084/GAR 515,007

MATERNAL AND CHILD HEALTH SERVICES

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MATHEMATICAL MODELS

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N85-13361/9/GAR 515,591

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PB85-138584/GAR 515,091

Observational Study of Transport in the Free Troposphere,
PB85-144145/GAR 515,104

Ponding of Effluents from Fossil Fuel Steam Electric Power Plants.
PB85-144244/GAR 515,106

Electrostriction and Dielectric Friction on Ions Moving through Compressible Polar Solvents.
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Mauritania: Rural Assessment and Manpower Surveys. Macro-Economic Simulation Model for Assessing Development Priorities.
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Mauritania: Rural Assessment and Manpower Surveys. Oasis Agriculture.
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Mauritania: Rural Assessment and Manpower Surveys. Employment Implications of Alternative Development Strategies.
PB85-144996/GAR 514,485

MEASURE AND INTEGRATION

Measure Determining Classes of Balls in Banach Space.
N85-13541/6/GAR 515,044

MEASURING INSTRUMENTS

Method for Evaluating Petrol Products Corrosivity Using Piezoelectric Crystals. Part 2: Instruction Manual.
N85-13073/0/GAR 515,669

Fail-Safe Devices for the Prevention of Hazardous Material Spills.
PB85-136642/GAR 515,236

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MEAT

Look at Meat and Poultry Production in the Soviet Union.
AD-A148 937/6/GAR 514,605

MECHANICAL ENGINEERING

Activities Report in Technology.
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MECHANICAL PROPERTIES

Evaluation of the Effects of Gamma Irradiation on the Mechanical Properties of High Density Polyethylene,
NUREG/CR-3898/GAR 515,012

MEDICAID

Analyze and Make Recommendations on Information and Assistance Needs and Resources from the Perspective of the Medicaid Agencies.
PB85-145829/GAR 514,561

MEDICAL CARE

Readjustment of Older Persons After Acute Hospitalization.
PB85-147494/GAR 514,597

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MEDICAL SERVICES

Credentialing of Physicians in the Army.
AD-A149 090/3/GAR 514,525

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PB85-146215/GAR 514,596

MEDICAL TECHNOLOGY

Medical Technology and Costs of the Medicare Program.
PB85-146215/GAR 514,596

MEDICARE

Medical Technology and Costs of the Medicare Program.
PB85-146215/GAR 514,596

MEETINGS

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Water Quality Modelling, Forecasting and Control,
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Mini-Seminar on Value Engineering, South Africa, June 1983.
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Report of an Exploratory Workshop on the Role of Anthropologists and other Social Scientists in Interdisciplinary Teams Developing Improved Food Production Technology.
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Drought Resistance in Crops with Emphasis on Rice.
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Automate or Liquidate Conference Held at the Metropole Hotel, Brighton on May 16-18, 1984.
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New Markets Through Improved Performance, Reinforced Thermoset Injection International Conference Held at the Library Theatre, Solihull on October 9-10, 1984.
PB85-144210/GAR 515,158

MELTDOWN

Thermal-Hydraulic Uncertainties Affecting Severe Accident Progression.
DE84017381/GAR 515,434

Modeling of Core Debris-Sodium-Concrete Interactions.
DE85000076/GAR 515,375

Bubble-Induced Mixing of Two Horizontal Liquid Layers with Non-Uniform Gas Injection at the Bottom.
DE85000097/GAR 515,377

Loop Simulation Capability for Sodium-Cooled Systems.
PB85-144236/GAR 515,469

MELTS

Program to Develop Thermite Reactions to Produce Refractory Borides and Carbides.
AD-A148 972/3/GAR 515,145

MEMBRANES (BIOLOGY)

Chloride Movement Across Basolateral Membrane of Necturus Epithelium.
AD-A148 929/3/GAR 514,648

MENTAL ABILITY

Multiple Resources and Brain Laterality.
AD-A148 912/9/GAR 514,645

MENTAL HEALTH

Proceedings: Second User's Workshop on Combat Stress Held at Fort Sam Houston, Texas on 29-30 April 1982.
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MERCHANT MARINE

USAWC (United States Army War College) Military Studies Program. Soviet Merchant Marine.
AD-A148 860/0/GAR 515,172

MERCHANT VESSELS

USAWC (United States Army War College) Military Studies Program. Soviet Merchant Marine.
AD-A148 860/0/GAR 515,172

MERCURY ION ENGINES

Ion Thruster System (8-cm) Cyclic Endurance Test.
N85-12937/7/GAR 515,603

MESOSCALE PHENOMENA

Investigations of Severe/Tornadic Thunderstorm Development and Evolution Based on Satellite and AVE/Sesame/VAS Data.
N85-13424/5/GAR 514,416

Dynamics of Coupled Ice-Ocean System in the Marginal Ice Zone: Study of the Mesoscale Processes and of Constitutive Equations for Sea Ice.
N85-13448/4/GAR 514,776

MESSAGE PROCESSING

Real-Time Message Process Simulation Capability.
AD-A149 017/6/GAR 515,282

Study of the Requirements of an Electronic Message Handling Facility.
AD-A149 087/6/GAR 514,819

METAL MATRIX COMPOSITES

Composite Structural Materials.
N85-12966/6/GAR 514,674

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Processing of Global Area Coverage (GAC) Data of the TIROS-N/NOAA Series Polar Orbiters.
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Integrated Varactor Tuned Coaxial Gunn Oscillator for 60 GHz Operation.
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MUON SPIN ROTATION

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NAVIGATIONAL AIDS

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NEGROES

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NEOPLASMS

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NEPTUNIUM

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Coordination in a Distributed Problem Solving Network.
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NEUTRON DETECTORS

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Portable Microdosimetry System.
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NITROGEN FIXATION
Biological Nitrogen Fixation in Flooded Rice Fields.
PB85-143782/GAR *514,377*

NITROGEN HETEROCYCLIC COMPOUNDS
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Use of Calibration Standards and the Correction for Sample Self-Attenuation in gamma-Ray Nondestructive Assay.
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Nulling at Symmetric Pattern Location with Phase-Only Weight Control.
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ORGANIZING

L'Organisation de la Qualite (Quality Organization).
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ORION NEBULA

Detection of Submillimeter Polarization in the Orion Nebula.
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ORNL

ORNL (Oak Ridge National Laboratory) Resource Conservation and Recovery Training Program.
DE85000167/GAR 514,526

ORR REACTOR

Data Acquisition and Control System for the K/sub 1C/-HSST Experiments at the ORR.
DE85001135/GAR 515,438

ORTHOTROPIC PLATES

Buckling Analysis for Rectangular Orthotropic Plates with Centrally Located Cutouts.
N85-13268/6/GAR 515,578

OSCILLATING FLOW

Organ-Pipe Oscillation.
N85-13199/3/GAR 515,178

OSCILLATION

Finite Element Analysis of Nonlinear Oscillations and Flutter of Shells of Revolution.
AD-A149 071/3/GAR 515,577

OSCILLATIONS

Theoretical and Experimental Investigations on the Fluid-Structure-Interactions in an Oscillation Model of a Pressurized Water Reactor.
DE84770496/GAR 515,435

OWNERSHIP

U.S. Cropland, Urbanization, and Landownership Patterns.
PB85-146637/GAR 514,361

OXIDIZERS

Observational Study of Transport in the Free Troposphere,
PB85-144145/GAR 515,104

OXYGEN

Optical Second Harmonic Generation for Surface Studies.
DE85000670/GAR 515,519

Calculation of Si(Li) X-Ray Detector Efficiencies.
DE85002732/GAR 515,211

Oscillator Strengths for OII Ions.
N85-13558/0/GAR 514,706

Sodium Chemistry in the MEL In-Sodium Creep Facilities,
PB85-143139/GAR 515,237

Importance of Active Sites for Char Gasification in Oxygen (Air) and Carbon Dioxide.
PB85-155984/GAR 515,673

OZONE

Building 1 Cooling Tower Ozone Project.
AD-A148 902/0/GAR 515,058

Cumulus Cloud Venting of Mixed Layer Ozone,
PB85-144137/GAR 514,408

PACE (PLASMA ARMATURE CHARACTERISATION EXPERIMENT)

Railgun Plasma Armature Characterisation Experiments,
AD-A149 083/8/GAR 514,784

PACIFIC OCEAN

Lithospheric Structure in the Pacific Geoid.
N85-13365/0/GAR 514,739

PACKAGING

Safety Aspects of Prepackaged Liquid Propellant Stages for Strategic Missiles,
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PANEL METHOD (FLUID DYNAMICS)

Viscous-Inviscid Aerodynamic Analysis of Two-Dimensional Thrust Augmentors.
N85-12861/9/GAR 514,317

PARABOLIC DIFFERENTIAL EQUATIONS

Time Discretization of Parabolic Problems by the Discontinuous Galerkin Method.
N85-13543/2/GAR 515,046

PARTIAL DIFFERENTIAL EQUATIONS

New Methods for Numerical Solution of One Class of Strongly Nonlinear Partial Differential Equations with Applications in Hydrodynamics.
AD-A149 026/7/GAR 515,023

Vectorization and Implementation of an Efficient Multigrid Algorithm for the Solution of Elliptic Partial Differential Equations.
AD-A149 049/9/GAR 515,029

Neumann Type Boundary Conditions for Hamilton-Jacobi Equations.
AD-A149 069/7/GAR 515,031

Hamilton-Jacobi Equations in Infinite Dimensions. Part 1. Uniqueness of Viscosity Solutions,
AD-A149 094/5/GAR 515,035

Transformation of Two and Three-Dimensional Regions by Elliptic Systems.
N85-13529/1/GAR 515,041

Time Discretization of Parabolic Problems by the Discontinuous Galerkin Method.
N85-13543/2/GAR 515,046

PARTICLE MOTION

Partikelmitfuehrung in Einem Kompressiblen Wirbel (Particle Entrainment in a Compressible Vortex).
N85-13192/8/GAR 515,532

PARTICLE SIZE

Investigations in Array Sizing. Part 1. Accuracy of the Sizing Process.
PB85-151637 515,250

PARTICLE TRACKS

Scintillator-Fiber Charged Particle Track-Imaging Detector.
N85-13560/6/GAR 515,360

PARTICLES

Reducing Pollutant Emissions by Fines Removal.
PATENT-4 485 747 515,090

Observational Study of Transport in the Free Troposphere,
PB85-144145/GAR 515,104

Theoretical Study of the Optical Properties of Diesel Particles.
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Evaluation of Modifications to the Mastin Double-Envelope House.
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PAYLOAD DELIVERY (STS)

Selected Tether Applications in Space: An Analysis of Five Selected Concepts.
N85-12921/1/GAR 515,706

PAYMENTS

Medical Technology and Costs of the Medicare Program.
PB85-146215/GAR 514,596

PEAS

Pigeonpeas (Cajanus cajan Millisp.): A Valuable Crop of the Tropics.
PB85-143105/GAR 514,375

PENETROMETERS

XSP(Experimental Static Penetrometer) Cone Penetrometer: A Performance Evaluation.
AD-A148 886/5/GAR 514,777

PENICILLINS

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PENNSYLVANIA

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PERCEPTION (PSYCHOLOGY)

Employee and Customer Perceptions of Service in Banks: Replication and Extension.
AD-A148 907/9/GAR 514,542

PERFORATION

Effects of Perforation L/D Ratio and Slotting on Stick Propellant Combustion.
AD-A148 854/3/GAR 515,490

PERFORMANCE

Disparities in Nuclear Power Plant Performance in the United States and the Federal Republic of Germany,
PB85-142735/GAR 515,467

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PERIPHERAL VISION

Effect of Extreme Peripheral Light on Dark Adaptation.
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PERSONNEL

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N85-13474/0/GAR 515,710

Determining the Need for Training: A Collection of Federal Agency Needs Assessment Practices,
PB85-144806/GAR 514,538

PERSONNEL DOSIMETRY

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DE85002198/GAR 515,382

PERSONNEL MANAGEMENT

Army Nurse Corps Personnel Management Practices (Executive Summary).
AD-A148 890/7/GAR 514,579

OPMS (Officer Personnel Management System) Mini-Review.
AD-A149 020/0/GAR 514,522

PERSONNEL SELECTION

Air Force Civilian Potential Appraisal System: Development.

AD-A148 909/5/GAR 514,515

PERTURBATIONS
A Proof of the Odd-Symmetry of the Phases for Minimum Weight Perturbation Phase-Only Null Synthesis.
AD-A148 976/4/GAR 514,862

PESTICIDES
Analytical Reference Standards and Supplemental Data: The Pesticides and Industrial Chemicals Repository.
PB85-143766/GAR 514,714

Guidance for the Reregistration of Manufacturing-Use and Certain End-Use Pesticide Products Containing Dialate.
PB85-144814/GAR 514,368

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PETROLOGY
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N85-13359/3/GAR 514,745

Petrologic Model of the Northern Mississippi Embayment Based on Satellite Magnetic and Ground Based Geophysical Data.
N85-13406/2/GAR 514,746

PHARMACOKINETICS
Blood Substitutes: Effects on Drug Pharmacokinetics.
AD-A148 928/5/GAR 514,639

PHASE
Improved Magnetic Bias and Delay Linearity in a Magnetostatic Wave Delay Line.
PAT-APPL-6-664 193/GAR 514,795

PHASE CONTRAST
Ion Contrasting Chamber for Discrimination of Grains and Textures.
N85-13036/7/GAR 514,993

PHASE DIAGRAMS
Mathematical Models for the Boiling Diagram of the Ideal Two-Component Mixture.
N85-13000/3/GAR 514,701

PHASE SHIFT KEYING
Transmission Analysis for the Use of 2-4 PSK (Phase Shift Keying) Modulation in Satellite Broadcasting.
N85-13151/4/GAR 515,290

PHASED ARRAYS
Nulling at Symmetric Pattern Location with Phase-Only Weight Control.
AD-A148 940/0/GAR 514,861

A Proof of the Odd-Symmetry of the Phases for Minimum Weight Perturbation Phase-Only Null Synthesis.
AD-A148 976/4/GAR 514,862

PHENOLS
Effect of Pentachlorophenol on the Growth and Mortality of Embryonic and Juvenile Steelhead Trout.
PB85-144129/GAR 514,574

PHILIPPINES
Technology Change in the Philippine Agricultural Machinery Industry.
PB85-141695/GAR 514,365

Landless Workers and Rice Farmers: Peasant Subclasses Under Agrarian Reform in Two Philippine Villages.
PB85-142644/GAR 514,351

PHOSPHINE
Some Addition and Complexation Reactions of a Silylated Amino(Methylene)Phosphine.
AD-A149 042/4/GAR 514,683

Synthesis of Some Highly Silylated Aminophosphines and Their Reactions with Carbon Tetrachloride.
AD-A149 066/3/GAR 514,684

PHOSPHINE/AMINO (METHYLENE)-SILYL
Some Addition and Complexation Reactions of a Silylated Amino(Methylene)Phosphine.
AD-A149 042/4/GAR 514,683

PHOSPHINE/BIS (TRIMETHYLSILYL)AMINO
Synthesis of Some Highly Silylated Aminophosphines and Their Reactions with Carbon Tetrachloride.
AD-A149 066/3/GAR 514,684

PHOSPHINE/BIS (TRIMETHYLSILYL)MEHTYL
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PHOTOCHEMICAL REACTIONS
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PHOTOCHEMISTRY
Solar-Assisted Hydrogen Generation by Photoelectrocatalysis.
PB85-149706/GAR 514,730

Limitations on the Efficiency of the Solar Photoreduction of Carbon.
PB85-151330/GAR 514,717

PHOTODISSOCIATION
Laboratory Studies of Atomic Collision Processes of Importance in Planetary Atmospheres.
N85-13758/6/GAR 514,397

PHOTOELECTRIC CELLS (SEMICONDUCTOR)
Two Photoelectrode Solid-State Photoelectrochemical Cell.
AD-A148 982/2/GAR 514,686

PHOTOELECTROCHEMICAL CELLS
Two Photoelectrode Solid-State Photoelectrochemical Cell.
AD-A148 982/2/GAR 514,686

PHOTOGEOLOGY
Relatorio Do Trabalho de Campo Realizado NAS Bacias DOS Rios Quebra Osso E Tanque Preto, NA Quadricula de Catas Altas, Minas Gerais (Report of the Field Work Performed in the Basins of the Quebra Osso and Tanque Petro Rivers in the Catas Altas Quadrangle, Minas Gerais).
N85-13359/3/GAR 514,745

PHOTOGRAPHIC ANALYSIS
Automatic Analysis of Speckle Photographs by Microcomputer.
PB85-138378/GAR 515,235

PHOTOGRAPHY
Measurement of Shock Induced Reaction in Rocket Propellants by Nanosecond Infrared Radiometry and Photography.
AD-P004 349/7/GAR 515,701

PHOTOIONIZATION
Resonantly Enhanced Multiphoton Ionization of Molecules.
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PHOTOLYSIS
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PHOTON STIMULATED DESORPTION
Characterization of Surfaces Using Electron and Photon Stimulated Desorption.
PB85-151587 514,718

PHOTOTHERMAL RADIOMETRY
Pulsed Photothermal Radiometry for Remote Sensing of Spectroscopic and Physical Properties of Thin Film.
AD-A149 080/4/GAR 515,200

PHOTOTRANSISTORS
High-Temperature Optically Activated GaAs Power Switching for Aircraft Digital Electronic Control.
N85-12901/3/GAR 514,337

PHOTOVOLTAIC CELLS
Control Aspects of the Schuchuli Village Stand-Alone Photovoltaic Power System.
N85-13157/1/GAR 514,944

PHOTOVOLTAIC POWER PLANTS
Utility-Interactive Photovoltaic Power Conditioning Technology in the United States.
DE85002634/GAR 514,941

PHOTOVOLTAIC POWER SUPPLIES
Utility-Interactive Photovoltaic Power Conditioning Technology in the United States.
DE85002634/GAR 514,941

PHTHALIC ACID/ (DIBUTYL-ESTER)
Di(n-Butyl) Phthalate: Reproduction and Fertility Assessment in CD-1 Mice When Administered in the Feed.
PB85-144798/GAR 514,673

PHYSICAL RADIATION EFFECTS
Interfaces under Laser Irradiation.
PB85-143246/GAR 515,524

PHYSICIANS
Credentialing of Physicians in the Army.
AD-A149 090/3/GAR 514,525

Physician Evaluation of Impairment/Disability.
HRP-0906093/0/GAR 514,619

Medical Technology and Costs of the Medicare Program.
PB85-146215/GAR 514,596

PHYSICS
Qualitative Process Theory.
AD-A148 987/1/GAR 514,810

PHYSIOLOGICAL FACTORS
Experiments with Hydrox at 1.3 Mpa (13 ATM).
N85-13471/6/GAR 514,622

PIANO MOVERS PROBLEM
On the Piano Movers' Problem. V. The Case of a Rod Moving in Three-Dimensional Space Amidst Polyhedral Obstacles.
AD-A148 969/9 515,050

PIEZOELECTRIC CRYSTALS
Method for Evaluating Petrol Products Corrosivity Using Piezoelectric Crystals. Part 2: Instruction Manual.
N85-13073/0/GAR 515,669

PIEZOELECTRIC GAGES
Development of Components for Micro-C Oriented Sensor Systems.
N85-13215/7/GAR 515,224

PILOTS
Statistical Analysis of Helicopter Pilot Performance during Instrument Flight Across Repeated Flights.
AD-A148 903/8/GAR 514,514

PIONS NEUTRAL
Large Acceptance Spectrometers for pi exp 0 Mesons.
DE85002472/GAR 515,357

PIPE FLOW
Organ-Pipe Oscillation.
N85-13199/3/GAR 515,178

PIPELINE TRANSPORTATION
Coal and Gas Pipeline Feasibility Study. Volume II. Technical and Economic Evaluation.
FE-2707-T1(V.2)/GAR 514,767

PIPES
Pipe-to-Pipe Impact Program.
DE84013162/GAR 515,429

PIPES (TUBES)
Corrosions des Laitons de Robinetterie (Corrosion of Brass in Potable Water Service).
N85-13037/5/GAR 514,994

Probability of Pipe Failure in the Reactor Coolant Loops of Combustion Engineering PWR Plants. Vol. 3. Double-Ended Guillotine Break Indirectly Induced by Earthquakes.
NUREG/CR-3663-V3/GAR 515,452

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PIPING SYSTEMS
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PISTON ENGINES
Evaluation of Heat Engine for Hybrid Vehicle Application.
N85-13245/4/GAR 515,604

PLANAR STRUCTURES
Autonomous Momentum Management for Space Station.
N85-12931/0/GAR 515,716

PLANETARY ATMOSPHERES
Laboratory Studies of Atomic Collision Processes of Importance in Planetary Atmospheres.
N85-13758/6/GAR 514,397

PLANETOLOGY
Activities at the Lunar and Planetary Institute.

N85-13694/3/GAR 514,386

PLANETS
Magnetohydrodynamic and Gasdynamic Theories for Planetary Bow Waves.
N85-13760/2/GAR 514,399

PLANT GENETICS
Mejoramiento de Arroz (Rice Improvement).
PB85-143113/GAR 514,376

PLANTS
Radioecological Investigations of Uranium Mill Tailings Systems. Fifth Technical Progress Report, October 1, 1983-September 30, 1984.
DE85000005/GAR 515,422

PLASMA
Convergent Spectral Representation for Three-Dimensional Inverse MHD Equilibria.
DE85000866/GAR 515,571

Cooperation and Competition on the Path to Fusion Energy.
DE85002392/GAR 515,330

Ohm's Law for Mean Magnetic Fields.
DE85002706/GAR 515,526

PLASMA ARMATURE
Railgun Plasma Armature Characterisation Experiments.
AD-A149 083/8/GAR 514,784

PLASMA INSTABILITY
Collective Effects in Spin Polarized Plasmas.
DE85002702/GAR 515,572

PLASMA JETS
Measurement of Local Heat Flux Density and Local Ion Saturation Current Density in a Plasma Jet--Translation.
AD-A149 060/8/GAR 515,570

PLASMA SHEATHS
Fundamental Studies on MPD(Magneto Plasma Dynamics) Thrusters.
AD-A149 074/7/GAR 515,600

PLASMA SPRAYING
High-Temperature Erosion of Plasma-Sprayed, Yttria-Stabilized Zirconia in a Simulated Turbine Environment.
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PLASMA WAVES
Reduction and Analysis of Data from the Plasma Wave Instruments on the IMP-6 and IMP-8 Spacecraft.
N85-12918/7/GAR 514,405

PLASMAS (PHYSICS)
Hydrodynamic Response of a Radiating Al Plasma Excited by a Proton Beam.
AD-A148 904/6/GAR 515,568

Raman Sidescattering in Laser-Produced Plasmas.
AD-A148 905/3/GAR 515,569

Fundamental Studies on MPD(Magneto Plasma Dynamics) Thrusters.
AD-A149 074/7/GAR 515,600

Railgun Plasma Armature Characterisation Experiments.
AD-A149 083/8/GAR 514,784

PLASMODIUM FALCIPARUM
Army Drug Development Program. Phase I. Clinical Testing.
AD-A148 919/4/GAR 514,638

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PLASTICS INDUSTRY
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PLATINUM COMPOUNDS
Interactions Between Corrosion and Creep of Uncoated and Coated Superalloys in Sulfate Melts.
N85-13038/3/GAR 514,995

PLUG NOZZLES
Experimental Investigation of Shock-Cell Noise Reduction for Dual-Stream Nozzles in Simulated Flight.
N85-13549/9/GAR 515,687

Experimental Investigation of Shock-Cell Noise Reduction for Single Stream Nozzles in Simulated Flight.
N85-13550/7/GAR 515,688

PLUMES
Development of Computational Fluid Dynamics at NASA Ames Research Center.
N85-12866/8/GAR 514,320

PLUTONIUM
Recent Development in Pyrochemistry at Los Alamos.
DE85000174/GAR 515,388

Nondestructive Assay System Development for a Plutonium Scrap Recovery Facility.
DE85002421/GAR 515,412

Diffusion of Plutonium in Compacted, Brine-Saturated Bentonite.
DE85002440/GAR 515,413

PLUTONIUM 238
In Situ Vitrification Pilot-Scale Radioactive Test.
DE85002671/GAR 515,416

PLUTONIUM 239
Organic Complexant-Enhanced Mobility of Toxic Elements in Low-Level Wastes.
DE85002375/GAR 515,410

In Situ Vitrification Pilot-Scale Radioactive Test.
DE85002671/GAR 515,416

PMMA
Effect of Ultraviolet Radiation on Transparent Polymer Films as Determined Using In Situ FTIR-RA Spectroscopy. Volume I. Photodegradation of Transparent Polymer Films.
DE84013039/GAR 515,011

POINTING CONTROL SYSTEMS
Design, Fabrication and Delivery of a Spacelab Neutral Buoyancy Instrument Pointing System (IPS) Mockup.
N85-12934/4/GAR 514,532

POLAR REGIONS
Mars Polar Volatiles: Topographic and Geologic Setting.
N85-13708/1/GAR 514,395

POLARIZED ELECTROMAGNETIC RADIATION
Detection of Submillimeter Polarization in the Orion Nebula.
N85-13700/8/GAR 514,388

POLITICAL NEGOTIATIONS
Counterforce Deadlock: Are Arms Control Agreements Still Possible.
AD-A148 872/5/GAR 514,493

POLLUTION ABATEMENT
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AD-A148 995/4/GAR *514,687*

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AD-A149 011/9/GAR *514,688*

RADAR RECEIVERS
Bistatic Coherent Radar Receiving System.
PAT-APPL-6-666 841/GAR *515,308*

RADAR SCATTERING
Scattering Models in the Microwave Regime.
N85-13361/9/GAR *515,591*

RADAR TRACKING
Multi Target Tracking by Dynamic Scene Analysis,
AD-A148 922/8/GAR *515,307*

RADIANT FLUX DENSITY
Software Used with the Flux Mapper at the Solar Parabolic Dish Test Site.
N85-13376/7/GAR *514,921*

RADIATION CHEMISTRY
Radiation Laboratory (University of Notre Dame) Quarterly Report, April 1, 1984-June 30, 1984.
DE85002635/GAR *514,728*

Thermal Effects in Radiation Processing.
DE85002638/GAR *514,729*

Radiation Processing for Plastics and Rubber 2. International Conference Held at University of Kent at Canterbury on 28-30 March 1984.
PB85-144194/GAR *515,014*

RADIATION DETECTORS
Impact of Instrument Response Variations on Health Physics Measurements.
DE85000860/GAR *514,583*

Workshop on Detectors for Relativistic Nuclear Collisions: Proceedings.
DE85001402/GAR *515,348*

RADIATION DOSES
Biological Characterization of Radiation Exposure and Dose Estimates for Inhaled Uranium Milling Effluents - Annual Progress Report, April 1, 1983-March 31, 1984.
NUREG/CR-3984/GAR *514,657*

RADIATION EFFECTS
Genetic Effects of Microwave Exposure on Mammalian Cells In Vitro. Volume 2. Appendix A. Cytogenetics and Growth Kinetics Data, 850 MHz.
AD-A148 866/7/GAR *514,652*

Genetic Effects of Microwave Exposure on Mammalian Cells In Vitro. Volume 2. Appendix B. Cytogenetics and Growth Kinetics Data, 1.2 GHz.
AD-A148 867/5/GAR *514,653*

Measurement and Prediction of Thermal Injury in the Retina of the Rhesus Monkey.
AD-A148 977/2/GAR *514,654*

Interfaces under Laser Irradiation,
PB85-143246/GAR *515,524*

Radiation Processing for Plastics and Rubber 2. International Conference Held at University of Kent at Canterbury on 28-30 March 1984.
PB85-144194/GAR *515,014*

KEYWORD INDEX

RADIATION HARDENING
Radiation Hardening of Semiconductor Devices. 1976-January 1985 (Citations from the Energy Data Base).
PB85-855161/GAR *514,799*

RADIATION HEATING
Thermal Effects in Radiation Processing.
DE85002638/GAR *514,729*

RADIATION INJURIES
Measurement and Prediction of Thermal Injury in the Retina of the Rhesus Monkey.
AD-A148 977/2/GAR *514,654*

RADIATION MEASURING INSTRUMENTS
Software Used with the Flux Mapper at the Solar Parabolic Dish Test Site.
N85-13376/7/GAR *514,921*

RADIATION MONITORS
Monte Carlo Simulation of the Sequential Probability Ratio Test for Radiation Monitoring.
DE85002409/GAR *515,355*

RADIATION PROTECTION
Tripartite Conference on Radiation Protection: Canada, United Kingdom, United States (1949-1953).
DE84016029/GAR *514,614*

RADIATIVE TRANSFER
Scattering Models in the Microwave Regime.
N85-13361/9/GAR *515,591*

RADICALS
Radiation Laboratory (University of Notre Dame) Quarterly Report, April 1, 1984-June 30, 1984.
DE85002635/GAR *514,728*

RADIO RECEIVERS
Short-wave Radio Receivers. 1975-February 1985 (Citations from the INSPEC: Information Services for the Physics and Engineering Communities Data Base).
PB85-855286/GAR *515,297*

RADIO TRANSMISSION
Digital Radio Link: Wave Propagation Measurements Using Narrow Band Technique.
N85-13152/2/GAR *515,291*

Simulation d'Une Chaine de Transmission a Elements Faiblement Non Lineaires. Calcule des Produits d'Intermodulation sur UN Signal Compose de N Porteuses (Simulation of a Transmission Circuit Composed of Slightly Nonlinear Elements. Computation of the Intermodulation on Signals Composed of N Carriers).
N85-13167/0/GAR *514,659*

RADIOACTIVE AEROSOLS
Aerosol Release and Transport Program Semiannual Progress Report for April 1984-September 1984,
NUREG/CR-3830-V2/GAR *515,424*

RADIOACTIVE CONTAMINANTS
Air Sampling Devices. March 1976-January 1985 (Citations from the Energy Data Base).
PB85-854792/GAR *515,252*

RADIOACTIVE EFFLUENTS
Influence of Water Droplets from a Cooling Tower Vapour Cloud on the Deposition of Radioactive Compounds from Waste Plumes from Nuclear Power Stations.
WINDSCALE-TRANS-849/GAR *515,426*

RADIOACTIVE ISOTOPES
Field Experiment Determinations of Distribution Coefficients of Actinide Elements in Sulfate Lake Environments.
NUREG/CR-4094/GAR *515,341*

RADIOACTIVE MATERIALS
Title List of Documents Made Publicly Available October 1-31, 1984.
NUREG-0540-V6-N10/GAR *515,366*

RADIOACTIVE WASTE DISPOSAL
Congressional Budget Request, FY 1985. Volume 2. Energy Supply Research and Development; Nuclear Waste Fund.
DE84009775/GAR *514,875*

Index to Published Geologic Maps in the Region around the Potential Yucca Mountain Nuclear Waste Repository Site, Southern Nye County, Nevada.
DE85000280/GAR *515,389*

Mathematical Modeling and Evaluation of Radionuclide Transport Parameters from the ANL Laboratory Analog Program.
DE85000782/GAR *515,393*

Near-Dome Geologic Findings - Richton Dome, Mississippi: Annual Status Report for FY 83.
DE85000787/GAR *515,394*

Engineered Sorbent Barriers for Low-Level Waste.
DE85000833/GAR *515,397*

Transport Assessment - Arid: Measurement and Prediction of Water Movement Below the Root Zone.
DE85000834/GAR *515,398*

Assessing the Performance of Geologic Repositories for Nuclear Waste.
DE85001197/GAR *515,399*

Assessment of Drilling Fluid Tracers Used to Monitor Borehole Development for Hydrochemical Sampling.
DE85001222/GAR *515,400*

Distribution of Radionuclides and Water in Bandelier Tuff Beneath a Former Los Alamos Liquid Waste Disposal Site after 33 Years.
DE85001406/GAR *515,402*

Preclosure Radiological Calculations to Support Salt Site Evaluations.
DE85001539/GAR *515,403*

Comments on a Letter by George D. DeBuchananne (US Geological Survey) Regarding the Use of Salt Domes for High-Level Waste Disposal.
DE85002302/GAR *515,404*

Low Level Radioactive Waste Disposal Siting: A Social and Technical Plan for Pennsylvania. Volume 3. Technical Analyses.
DE85002330/GAR *515,405*

Low Level Radioactive Waste Disposal Siting: A Social and Technical Plan for Pennsylvania. Volume 2. Socioeconomic Analyses.
DE85002331/GAR *515,406*

Low Level Radioactive Waste Disposal Siting: A Social and Technical Plan for Pennsylvania. Volume 1. An Overview of Options and Alternatives.
DE85002332/GAR *515,407*

In Situ gamma-Ray Spectrometric Analysis of Radionuclide Distributions at a Commercial Shallow Land Burial Site.
DE85002376/GAR *515,411*

RADIOACTIVE WASTE FACILITIES
Conceptual Design Report for a Remotely Operated Cask Handling System. Revision 1.
DE85001184/GAR *515,380*

Assessing the Performance of Geologic Repositories for Nuclear Waste.
DE85001197/GAR *515,399*

Distribution of Radionuclides and Water in Bandelier Tuff Beneath a Former Los Alamos Liquid Waste Disposal Site after 33 Years.
DE85001406/GAR *515,402*

Waste Accountability, Shipping, and Packaging (WASP) Handbook.
DE85001535/GAR *515,381*

Preclosure Radiological Calculations to Support Salt Site Evaluations.
DE85001539/GAR *515,403*

Organic Complexant-Enhanced Mobility of Toxic Elements in Low-Level Wastes.
DE85002375/GAR *515,410*

Geological and Geophysical Evidence of Structures in Northwest-Trending Washes, Yucca Mountain, Southern Nevada, and Their Possible Significance to a Nuclear Waste Repository in the Unsaturated Zone.
DE85002658/GAR *515,415*

Radionuclide Migration in Groundwater - Annual Report for FY 1983.
NUREG/CR-3712/GAR *515,423*

Progress in Evaluation of Radionuclide Geochemical Information Developed by DOE (Department of Energy) High-Level Nuclear Waste Repository Site Projects: Report for April-June 1984.
NUREG/CR-3851-V3/GAR *515,419*

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NUREG/CR-3904/GAR *515,425*

RADIOACTIVE WASTE MANAGEMENT
Transport and Capture of Colloidal Particles in Single Fractures.
DE85000413/GAR *515,390*

RADIOACTIVE WASTE PROCESSING
Actinide Separations by Supported Liquid Membranes.
DE84013462/GAR *515,386*

Rockwell Hanford Operations Defense Waste and Byproducts Management Monthly Report for July 1984.
DE85000558/GAR *515,391*

Method of Final Conditioning of Solid Radioactive Wastes.
DE85900002/GAR *515,417*

RADIOACTIVE WASTE STORAGE
Rockwell Hanford Operations Defense Waste and Byproducts Management Monthly Report for July 1984.
DE85000558/GAR *515,391*

RADIOACTIVE WASTES
Evaluation of the Effects of Gamma Irradiation on the Mechanical Properties of High Density Polyethylene,
NUREG/CR-3898/GAR *515,012*

RADIOFREQUENCY INTERFERENCE
Error Analysis of Radiation Characteristics of an Unknown Interference Source Based on Power Measurements.
PB85-147999 *514,850*

RADIOLYSIS
Radiation Laboratory (University of Notre Dame) Quarterly Report, April 1, 1984-June 30, 1984.
DE85002635/GAR *514,728*

RADIOMETRIC RESOLUTION
LANDSAT Instruments Characterization.
N85-13358/9/GAR *514,822*

RADIOMETRY
Measurement of Shock Induced Reaction in Rocket Propellants by Nanosecond Infrared Radiometry and Photography,
AD-P004 349/7/GAR *515,701*

RADIONUCLIDE MIGRATION
Mathematical Modeling and Evaluation of Radionuclide Transport Parameters from the ANL Laboratory Analog Program.
DE85000782/GAR *515,393*

Radionuclide Migration in Groundwater - Annual Report for FY 1983.
NUREG/CR-3712/GAR *515,423*

RADIOPRESERVATION
Thermal Effects in Radiation Processing.
DE85002638/GAR *514,729*

RADIOSTERILIZATION
Thermal Effects in Radiation Processing.
DE85002638/GAR *514,729*

RADIUM 226
Radioecological Investigations of Uranium Mill Tailings Systems. Fifth Technical Progress Report, October 1, 1983-September 30, 1984.
DE85000005/GAR *515,422*

RADON 222
Radioecological Investigations of Uranium Mill Tailings Systems. Fifth Technical Progress Report, October 1, 1983-September 30, 1984.
DE85000005/GAR *515,422*

RAIL TRANSPORTATION
Surface Transportation: Demands and Needs. 1980-February 1985 (Citations from the NTIS Data Base).
PB85-855229/GAR *515,117*

RAILGUNS
Railgun Plasma Armature Characterisation Experiments,
AD-A149 083/8/GAR *514,784*

RAILROAD ACCIDENTS
Railroad/Highway Accident Report - Collision of Amtrak Passenger Train No. 301 on Illinois Central Gulf Railroad with Marquette Motor Service Terminals, Inc. Delivery Truck, Wilmington, Illinois, July 28, 1983.
PB84-917008/GAR *515,183*

Railroad Accident Reports.
PB85-916300/GAR *515,188*

RAILROADS
Railroad/Highway Accident Report - Collision of Amtrak Passenger Train No. 301 on Illinois Central Gulf Railroad with Marquette Motor Service Terminals, Inc. Delivery Truck, Wilmington, Illinois, July 28, 1983.
PB84-917008/GAR *515,183*

Railroad Accident Reports.
PB85-916300/GAR *515,188*

RAMAN SIDESCATTERING
Raman Sidescattering in Laser-Produced Plasmas.
AD-A148 905/3/GAR *515,569*

RANDOM ACCESS COMPUTER STORAGE
Semiconductor Random Access Memories: Integrated Circuit Testing and Reliability. 1975-February 1985 (Citations from the INSPEC: Information Services for the Physics and Engineering Communities Data Base).
PB85-855260/GAR *514,843*

Semiconductor Random Access Memories: Integrated Circuit Design and Fabrication. 1975-February 1985 (Citations from the INSPEC: Information Services for the Physics and Engineering Communities Data Base).
PB85-855294/GAR *514,844*

RANDOM ACCESS MEMORY
Semiconductor Random Access Memories: Integrated Circuit Testing and Reliability. 1975-February 1985 (Citations from the INSPEC: Information Services for the Physics and Engineering Communities Data Base).
PB85-855260/GAR *514,843*

Semiconductor Random Access Memories: Integrated Circuit Design and Fabrication. 1975-February 1985 (Citations from the INSPEC: Information Services for the Physics and Engineering Communities Data Base).
PB85-855294/GAR *514,844*

RANKINE CYCLE
Overview of Waste Heat Utilization Systems.
N85-13692/7/GAR *514,922*

RANKINE-HUGONIOT RELATION
Local Stability Analysis for a Planar Shock Wave.
N85-12864/3/GAR *515,530*

RAPID QUENCHING (METALLURGY)
Development of Rapidly Quenched Alloys with Special Physical Properties and of Processes for Their Continuous Production.
N85-13039/1/GAR *514,996*

RAPID TRANSIT RAILWAYS
Transportation Special Reports.
PB85-917000/GAR *515,189*

RATES
Fundamental Studies on MPD(Magneto Plasma Dynamics) Thrusters.
AD-A149 074/7/GAR *515,600*

RATIONS
Psychophysical Bases for the Sensory Assessment of Rations.
AD-A148 849/3/GAR *514,541*

RAY TRACING
Concentrator Optical Characterization Using Computer Mathematical Modelling and Point Source Testing.
N85-13375/9/GAR *514,920*

REACTING FLOW
AFOSR(Air Force Office of Scientific Research) Research Meeting on Diagnostics of Reacting Flow Held at New Haven, Connecticut on 21-22 March 1984.
AD-A149 023/4/GAR *515,592*

REACTION INJECTION MOLDING
Reaction Injection Molding, 1970-February 1985 (Citations from the U. S. Patent Data Base).
PB85-855419/GAR *515,161*

REACTION KINETICS
Studies of the Mechanisms and Rates with Which Nitrogen Species are Incorporated into Cloud Water and Precipitation.
PB85-144350/GAR *514,419*

Kinetics of Nitric Oxide Formation in Laminar and Turbulent Methane Combustion.
PB85-149698/GAR *514,716*

REACTIVE ION ETCHING
Reactive Ion Etching and Reactive Sputter Etching. 1976-February 1985 (Citations from the INSPEC: Information Services for the Physics and Engineering Communities Data Base).
PB85-855047/GAR *515,160*

REACTIVE SPUTTER ETCHING
Reactive Ion Etching and Reactive Sputter Etching. 1976-February 1985 (Citations from the INSPEC: Information Services for the Physics and Engineering Communities Data Base).
PB85-855047/GAR *515,160*

REACTOR ACCIDENTS
Pipe-to-Pipe Impact Program.
DE84013162/GAR *515,429*

Coolability of UO2 Debris Beds in Pressurized Water Pools: DCC-1 and DCC-2 Experiment Results.
DE84017005/GAR *515,373*

Debris Dispersal in Reactor Material Experiments on Corium-Water Thermal Interactions in Ex-Vessel Geometry.
DE85000077/GAR *515,376*

Hydrogen Flame Acceleration and Transition to Detonation.
DE85000611/GAR *515,378*

Applications of the CONTAIN 1.0 Computer Code to the Analysis of Containment Loading under Severe Accident Conditions.
DE85002430/GAR *515,383*

MARCON - Development and Applications to Containment Loading Calculations.
DE85002442/GAR *515,384*

REACTOR COMPONENTS
Leakage-Flow-Induced Vibration of a Tube-in-Tube Slip Joint.
DE84007301/GAR *515,427*

REACTOR CONTROL SYSTEMS
Methodology for Validation of Safety Parameters and Fault Identification.
DE84014685/GAR *515,431*

REACTOR CORE DISRUPTION
Fuel and Control Rod Failure Behavior During Degraded Core Accidents.
DE84014535/GAR *515,430*

Coolability of UO sub 2 with Downward Heat Removal: The D10 Experiment.
DE84017007/GAR *515,374*

Fuel Disruption Mechanisms Determined In-Pile in the ACRR (Annular Core Research Reactor).
NUREG/CR-3780/GAR *515,482*

REACTOR CORES
Titan: An Advanced Three Dimensional Coupled Neutronic/Thermal-Hydraulics Code for Light Water Nuclear Reactor Core Analysis.
PB85-144251/GAR *515,470*

REACTOR DECOMMISSIONING
Shippingport Atomic Power Station. Technical Progress Report, January 26, 1984-September 30, 1984.
DE85001395/GAR *515,401*

REACTOR INSTRUMENTATION
Methodology for Validation of Safety Parameters and Fault Identification.
DE84014685/GAR *515,431*

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NUREG/CR-0169-V22/GAR *515,450*

REACTOR KINETICS
MCNP Code.
DE85002565/GAR *515,486*

REACTOR MAINTENANCE
Maintenance Personnel Performance Simulation (MAPPS) Model.
DE85002324/GAR *515,361*

REACTOR MATERIALS
Modeling of Core Debris-Sodium-Concrete Interactions.
DE85000076/GAR *515,375*

Iodine Sorption/Desorption from Low-Alloy Steel and Graphite. Draft.
DE85000966/GAR *515,477*

REACTOR NOISE
Report of the First United States Conference on Utility Experience with Neutron Noise Analysis.
DE85002459/GAR *515,447*

REACTOR OPERATORS
Nuclear Power Plant Control Room Operators' Performance Research.
DE85002326/GAR *515,362*

Development of Methods for Nuclear Power Plant Personnel Qualifications and Training.
DE85002559/GAR *514,529*

REACTOR PROTECTION SYSTEMS
Methodology for Validation of Safety Parameters and Fault Identification.
DE84014685/GAR *515,431*

REACTOR SAFETY EXPERIMENTS
Reactor Safety Research Quarterly Report January-March 1984, Volume 29.
NUREG/CR-3816-V1/GAR *515,455*

REACTOR SIMULATORS
Los Alamos Nuclear Plant Analyzer: An Interactive Power-Plant Simulation Program.
DE85002412/GAR *515,445*

REAL NUMBERS
Computable Real Analysis,
AD-A149 079/6/GAR *515,032*

REAR AREAS
USAWC (United States Army War College) Military Studies Program Paper. Rear Area Protection at Corps and Division. Is It Enough.
AD-A148 966/5/GAR *515,270*

REASONING
Qualitative Process Theory.
AD-A148 987/1/GAR *514,810*

REBUILDING
Azores Earthquake Reconstruction, January 1, 1980: A Report after Two and One Half Years,
PB85-144616/GAR *514,773*

RECORDING INSTRUMENTS
Health Equipment Information Number 127, October 1984 (Evaluation Issue).
PB85-135606/GAR *514,626*

Surveillance Receiver/Recorders.
PB85-144848 *514,560*

RECOVERY
Co-Production of Gas and Water, Third Year.
PB85-156974/GAR *514,769*

RECTANGULAR PLATES
Bulletin of the Faculty of Engineering, Hokkaido University, No. 123.
N85-13075/5/GAR *514,446*

Buckling Analysis for Rectangular Orthotropic Plates with Centrally Located Cutouts.
N85-13268/6/GAR *515,578*

REFINERIES
Review of the Pollution Abatement Programs Relating to the Petroleum Refinery Industry in the Great Lakes Basin.
AD-A149 008/5/GAR *515,082*

Land Treatment of Petroleum Refinery Sludges.
PB85-148708/GAR *515,112*

REFRACTORIES
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PB85-855203/GAR *514,964*

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PB85-855211/GAR *514,965*

REFRACTORY MATERIALS
Program to Develop Thermite Reactions to Produce Refractory Borides and Carbides.
AD-A148 972/3/GAR *515,145*

REFRIGERATORS
Very-Low-Temperature Cooling Systems.
PB85-151728 *515,589*

Fundamentals of Alternate Cooling Systems.
PB85-151736 *515,590*

REFUGEES
Study of English Language Training for Refugees in the United States. Phase 3: The Influence of Language Training and Employment on Adult Refugees' Acquisition of English.
SHR-0012016/GAR *514,513*

REFUSE DERIVED FUELS
Economic Analysis of Three Methods to Dry Biomass Fuels.
DE85000178/GAR *515,614*

REGENERATIVE FUEL CELLS
Regenerative Fuel Cell Energy Storage System for a Low Earth Orbit Space Station.
N85-13371/8/GAR *514,945*

REGIONAL PLANNING
Manejo de Cuencas y Monitoreo Ambiental (Watershed Resources Management and Environmental Monitoring),
PB85-141711/GAR *515,098*

Analysis of Watershed Management (El Salvador, Guatemala, Honduras),
PB85-141745/GAR *515,099*

REGULARIZATION (MATHEMATICS)
Remark on Regularization in Hilbert Spaces.
AD-A149 046/5/GAR *515,027*

REGULATIONS
Analyze and Make Recommendations on Information and Assistance Needs and Resources from the Perspective of the Medicaid Agencies.
PB85-145829/GAR *514,561*

REGULATORS
Robustesse des Regulateurs de Pilotage Multivariables Continus: Synthese de l'Etude (Strength of Continuous Multivariable Piloting Regulators: Study Synthesis),
PB85-140853/GAR *514,343*

Robustesse de Regulateurs de Pilotage Multivariables (Strength of Multivariable Piloting Regulators),
PB85-141570/GAR *514,344*

REINFORCED CONCRETE
General Engineering Specifications for 6000 Tpd SRC-I Demonstration Plant.
DE85000032/GAR *515,610*

REISSNER THEORY
Bulletin of the Faculty of Engineering, Hokkaido University, No. 123.
N85-13075/5/GAR *514,446*

RELAYS
Transdigitizer for Relaying Signals from Global Positioning System (GPS) Satellites.
PAT-APPL-6-866 784/GAR *515,305*

RELIABILITY
Reliability of Adhesive Bonds Under Severe Environments. Report of the Committee on Reliability of Adhesive Bonds in Severe Environments.
AD-A149 010/1/GAR *515,125*

Test Experience on an Ultrareliable Computer Communication Network.
N85-13514/3/GAR *514,827*

RELIABILITY ANALYSIS
Analysis of the Impact of Error Detection on Computer Performance.
N85-13477/3/GAR *514,824*

RELIABILITY ENGINEERING
Fiabilite Composants et Technologies d'Assemblage (Component Reliability and Assembling Technologies).
N85-13258/7/GAR *515,153*

RELIC RADIATION
Search for the Radiative Decay of a Cosmic Relic Particle with IUE.
N85-13707/3/GAR *514,394*

RELIEF VALVES
Closeout of IE Bulletin 80-25: Operating Problems with Target Rock Safety-Relief Valves at Boiling Water Reactors.
NUREG/CR-3794/GAR *515,454*

RELIGION
Political Impact of Islam in Sudan: Numayri's Islamization Program.
AD-A148 958/2/GAR *514,507*

REMOTE CONTROL
Human Role in Space. Volume 3: Generalizations on Human Roles in Space.
N85-13475/7/GAR *515,711*

REMOTE HANDLING EQUIPMENT
Remote Handling Requirements and Considerations for D-T Fusion Reactors.
DE85000940/GAR *515,317*

Conceptual Design Report for a Remotely Operated Cask Handling System. Revision 1.
DE85001194/GAR *515,380*

REMOTE SENSING
ASEE-NASA Summer Faculty Fellowship Program (Aeronautics and Research), 1984.
N85-13664/6/GAR *514,431*

RENEWABLE ENERGY RESOURCES
Biological Gasification of Renewable Resources.
PB85-156966/GAR *515,675*

REPAIR
Combat Battle Damage Assessor Expert System,
AD-A148 898/0/GAR *515,268*

REPORTS
Air Force Office of Scientific Research (AFOSR) Technical Report Summaries. Third Quarter (CY).
AD-A148 965/7/GAR *514,441*

REREGISTRATION
Guidance for the Reregistration of Manufacturing-Use and Certain End-Use Pesticide Products Containing Dialate.
PB85-144814/GAR *514,368*

RESEARCH
European Scientific Notes. Volume 39, Number 2.
AD-A148 994/7/GAR *514,426*

NASA/ASEE Summer Faculty Fellowship Program, 1984.
N85-13662/0/GAR *514,430*

RESEARCH AND DEVELOPMENT
Project Resources Planning and Control.
N85-13666/1/GAR 514,533

Forschungsbericht 1979-1982. Teil 2: Projektteil (Research Report 1979-1982. Part 2: Projects).
N85-13667/9/GAR 514,534

International Comparative Study of Systems for the Government Advancement of Research and Development.
N85-13689/3/GAR 514,500

RESEARCH MANAGEMENT
US Army Test and Evaluation Command Test Operations Procedure 'Durability'.
AD-A149 003/6/GAR 515,198

Selecao de Projetos de p and D COM Retornos Nao-Numericos (R and D Project Selection with Nonnumerical Returns).
N85-13665/3/GAR 515,054

International Comparative Study of Systems for the Government Advancement of Research and Development.
N85-13689/3/GAR 514,500

Directory of Scientific Research, 1984.
PB85-139848/GAR 514,453

Research Priorities for Improving the Effectiveness of Active Solar Hot Water and Space Conditioning Systems.
PB85-153443/GAR 515,076

RESEARCH PROJECTS
Forschungsbericht 1979-1982. Teil 2: Projektteil (Research Report 1979-1982. Part 2: Projects).
N85-13667/9/GAR 514,534

International Comparative Study of Systems for the Government Advancement of Research and Development.
N85-13689/3/GAR 514,500

Spectroscopie de Muons (Muon Spectroscopy).
PB85-144681/GAR 515,241

Basic Research on Macromolecular Dynamics.
PB85-152833/GAR 515,015

Anaerobic Digestion of Biomass: Status Summary and Research and Development Needs, 1983 (Condensed Version).
PB85-159457/GAR 515,676

RESEARCH REACTORS
Statement of Dr. James S. Kane Before the Committee on Science and Technology, Energy Development and Applications Subcommittee and Energy Research and Production Subcommittee, US House of Representatives.
DE85001188/GAR 515,488

ELAF Failed Fuel Plate Examination.
DE85002516/GAR 515,480

RESIDENTIAL BUILDINGS
Pacific Northwest Residential Energy Survey, Spring 1983.
DE85000486/GAR 514,897

Pacific Northwest Residential Energy Consumption Survey, Spring 1983. Exhibit Booklet.
DE85000490/GAR 514,898

Record of Decision: The Expanded Residential Weatherization Program.
DE85000630/GAR 514,900

Options for Coordinating Low-Income Fuel Assistance with Weatherization and Conservation Services.
DE85002169/GAR 514,461

RESIDUAL STRESS
Nondestructive Evaluation of Residual Stress in Low-Carbon Steel.
N85-13264/5/GAR 514,997

RESIN MATRIX COMPOSITES
Tough Composite Materials.
N85-12941/9/GAR 514,973

RESOURCE MANAGEMENT
Centralized Control versus Command Flexibility at the Installation.
AD-A148 852/7/GAR 514,421

Resource Management: A Prioritization Process.
AD-A149 073/9/GAR 514,523

RESOURCES MANAGEMENT
Project Resources Planning and Control.
N85-13666/1/GAR 514,533

RESPIRATORY SYSTEM
Effect of Ventilation and Perfusion Imbalance on Inert Gas Rebreathing Variables.
PB85-144087 514,650

REVERBERATION
An Oceanic Reverberation Model.
AD-A149 000/2/GAR 515,515

REVERSE-FIELD PINCH
Compact Reversed-Field Pinch Reactors (CRFPR): Preliminary Engineering Considerations.
DE85002351/GAR 515,329

RHENIUM
Studies of the Kinetics and Mechanisms of Ammonia Synthesis and Hydrodesulfurization on Metal Single Crystal Surfaces.
DE85001650/GAR 514,697

RHODIUM
Optical Second Harmonic Generation for Surface Studies.
DE85000670/GAR 515,519

RIBONUCLEIC ACIDS
Mistranslation of the mRNA Encoding Bacteriophage T7 0.3 Protein.
AD-A148 875/8/GAR 514,632

RICE PLANTS
Technology Change in the Philippine Agricultural Machinery Industry.
PB85-141695/GAR 514,365

Drought Resistance in Crops with Emphasis on Rice.
PB85-143055/GAR 514,373

Mejoramiento de Arroz (Rice Improvement).
PB85-143113/GAR 514,376

Biological Nitrogen Fixation in Flooded Rice Fields.
PB85-143782/GAR 514,377

RICHARDSON NUMBER
Richardson Number Criterion for the Nonlinear Stability of Three-Dimensional Stratified Flow.
AD-A148 971/5/GAR 515,528

RISK
Interval Mathematics Reports.
N85-13536/6/GAR 515,042

RISK ASSESSMENT
BURYIT/ANALYZ: A Computer Package for Assessment of Radiological Risk of Low-Level Radioactive Waste Land Disposal. User's Manual.
NUREG/CR-3994/GAR 515,425

Risk Analysis of Crane Accidents, Gulf of Mexico OCS Region.
PB85-142743/GAR 515,187

RIVER BASIN DEVELOPMENT
Manejo de Cuencas y Monitoreo Ambiental (Watershed Resources Management and Environmental Monitoring).
PB85-141711/GAR 515,098

RIVER BASINS
Relatorio Do Trabalho de Campo Realizado NAS Bacias DOS Rios Quebra Osso E Tanque Preto, NA Quadricula de Catas Altas, Minas Gerais (Report of the Field Work Performed in the Basins of the Quebra Osso and Tanque Petro Rivers in the Catas Altas Quadrangle, Minas Gerais).
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RIVETED JOINTS
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N85-13260/3/GAR 515,256

ROADS
Etat des Connaissances Relatives a l'Utilisation en Remblais Routiers de Cendres Volantes de Fraiche Production Provenant d'une ou de Plusieurs Centrales Electriques (Study of Physical Characteristics of Freshly Produced Fly-Ash from the Exhaust Gases of Coal-Fired Power Stations).
PB85-139426/GAR 515,094

ROBOTICS
Evaluation of Automated Decisionmaking Methodologies and Development of an Integrated Robotic System Simulation.
N85-13516/8/GAR 514,828

ROBOTS
Planning of Minimum-Time Trajectories for Robot Arms.
AD-A148 956/6/GAR 515,162

Computerized Manufacturing Automation: Employment, Education, and the Workplace. Volume 2. Working Papers. Part A: Case Studies on the Introduction of Programmable Automation in Manufacturing: Work Environment Effects. Part B: Final Report: Education and Training Case Study Series.
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Computerized Manufacturing Automation: Employment, Education, and the Workplace. Volume 2. Working Papers. Part C: Individual Education and Training Case Studies.
PB85-138832/GAR 515,156

ROCKET-BORNE INSTRUMENTS
Launch Summary for 1978 - 1982.
N85-12924/5/GAR 515,722

ROCKET LAUNCHING
Launch Summary for 1978 - 1982.
N85-12924/5/GAR 515,722

ROCKET PROPELLANTS
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AD-A148 865/9 515,697

ROCKETS
Mixing, Chemical Reaction and Flow Field Development in Ducted Rockets.
DE85002710/GAR 515,597

ROLLER BEARINGS
Effect of Two Inner-Ring Oil-Flow Distribution Schemes on the Operating Characteristics of a 35 Millimeter Bore Ball Bearing to 2.5 Million Dn.
N85-13233/0/GAR 515,165

ROOFS
Investigation of Factors Influencing Infrared Roof Moisture Surveys Using a Mathematical Model.
DE85002300/GAR 515,121

ROTARY ENGINES
Evaluation of Heat Engine for Hybrid Vehicle Application.
N85-13245/4/GAR 515,604

ROTARY WING AIRCRAFT
Methodology for the Determination of Rotary Wing Aircraft Vulnerabilities in Air-to-Air Combat Simulation.
AD-A148 984/8/GAR 514,328

RUBBER INDUSTRY
Automate or Liquidate Conference Held at the Metropole Hotel, Brighton on May 16-18, 1984.
PB85-144202/GAR 515,157

RURAL AREAS
Use of Energy in Agricultural Households.
DE84770479/GAR 514,885

Rural Financial Markets and Income Distribution in Low Income Countries, Excerpt from Savings and Development.
PB85-134740/GAR 514,347

Mauritania: Rural Assessment and Manpower Surveys. Rural Income in Mauritania.
PB85-144574/GAR 514,484

Arab Republic of Egypt Nutrition Status Survey II, 1980.
PB85-144632/GAR 514,592

RURAL DEVELOPMENT
Population Growth and Development in Egypt: Farmers' and Rural Development Officials' Perspectives.
PB85-141661/GAR 514,350

RUTHENIUM 106
In Situ Vitrification Pilot-Scale Radioactive Test.
DE85002671/GAR 515,416

S CODES
Comparison of Structural Computer Programs Used for the Analysis of Spent Fuel Shipping Casks.
DE85002444/GAR 515,385

SACRAMENTO VALLEY (CA)
Investigation of Several Aspects of LANDSAT 4/5 Data Quality.
N85-13357/7/GAR 514,823

SAFEGUARDS
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NUREG/CR-3926-V1/GAR 515,483

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NUREG/CR-3926-V2/GAR 515,484

SAFETY
Repair, Evaluation, Maintenance, and Rehabilitation Research Program. Engineering Condition Survey of Concrete in Service.
AD-A148 893/1/GAR 515,080

Safety Aspects of Prepackaged Liquid Propellant Stages for Strategic Missiles.
AD-P004 350/5/GAR 515,702

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NUREG/CR-4070-V1/GAR 514,732

Transportation Initial Decisions and Orders and Board Opinions and Orders Adopted and Issued during the Month of February, 1984.
PB84-916702/GAR 514,501

Transportation Initial Decisions and Orders and Board Opinions and Orders Adopted and Issued during the Month of March, 1984.
PB84-916703/GAR 514,502

Transportation Initial Decisions and Orders and Board Opinions and Orders Adopted and Issued during the Month of April, 1984.
PB84-916704/GAR 514,503

SAFETY DEVICES
Fail-Safe Devices for the Prevention of Hazardous Material Spills.
PB85-138642/GAR 515,236

SAFETY FACTORS
Methode d'Essais de Telecabines (Test Methods for Cable Cars).
N85-13282/7/GAR 515,228

SAFING AND ARMING (ORDNANCE)
Calculation through Fault Tree Analysis of the Probability of a Warhead Being Armed Prior to Launch.
AD-P004 339/8/GAR 515,274

SALARIES
Military and Civilian Lifetime Earnings Comparisons.
AD-A148 844/4/GAR 514,458

SALES MANAGEMENT
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SALMO GAIRDNERI
Effect of Pentachlorophenol on the Growth and Mortality of Embryonic and Juvenile Steelhead Trout.
PB85-144129/GAR *514,574*

SALT DEPOSITS
Near-Dome Geologic Findings - Richton Dome, Mississippi: Annual Status Report for FY 83.
DE85000787/GAR *515,394*

Comments on a Letter by George D. DeBuchananne (US Geological Survey) Regarding the Use of Salt Domes for High-Level Waste Disposal.
DE85002302/GAR *515,404*

SAMPLERS
Soil Sampling Apparatus.
PAT-APPL-6-837 241/GAR *514,780*

SAMPLING
W.E. Johnson's 'Sufficientness' Postulate.
AD-A149 014/3/GAR *515,022*

Standard Operating Procedures for Conducting Sampling and Sample Bank Audits,
PB85-143279/GAR *515,238*

SANDSTONES
Enhanced Recovery of Oil from Subsurface Reservoirs with Carbon Dioxide. Final Report.
DE85000109/GAR *514,759*

SANITATION
Environmenal Sanitation Master Plan for Training and Education in Tanzania.
PB85-143022/GAR *515,101*

SAPONINS
Saponin-Based Polyether Polyols.
PAT-APPL-6-548 849/GAR *514,643*

SATELLITE ATMOSPHERES
Outer Satellite Atmospheres: Their Nature and Planetary Interactions.
N85-13759/4/GAR *514,398*

SATELLITE-BORNE INSTRUMENTS
Launch Summary for 1978 - 1982.
N85-12924/5/GAR *515,722*

SATELLITE IMAGERY
Investigations of Severe/Tornadic Thunderstorm Development and Evolution Based on Satellite and AVE/Sesame/VAS Data.
N85-13424/5/GAR *514,416*

Noise Removal in Multichannel Images.
N85-13526/7/GAR *514,829*

SATELLITE NETWORKS
Apollo System Requirements Specification.
N85-13150/6/GAR *515,289*

SATELLITE TRANSMISSION
Transmission de la Television en Modulation de Frequence (Television Transmission in Frequency Modulation).
N85-13146/4/GAR *515,285*

Transmission Analysis for the Use of 2-4 PSK (Phase Shift Keying) Modulation in Satellite Broadcasting.
N85-13151/4/GAR *515,290*

SAVANNAH RIVER PLANT
Integration of NDA Instruments into the Savannah River Plant Computer Network.
DE85002416/GAR *515,356*

SCALE SYSTEM
SCALE: A Modular Code System for Performing Standardized Computer Analyses for Licensing Evaluation - Additions and Revisions.
NUREG/CR-0200-REV 2/GAR *515,481*

SCATTERING CROSS SECTIONS
Energieuebertraege bei Atom-Molekuel-Streuexperimenten AM Beispiel der Systeme SF6-AR, CF4-Ne und Xe-CO2 im I 1 Ev-Bereich (Energy Transfer in Atom-Molecule Scattering Experiments in the 1EV Region with SF6-AR, CF4-Ne and Xe-CO2 Systems as Examples).
N85-13588/7/GAR *514,708*

Untersuchung der K Wechselwirkung bei Stossenergien Zwischen 0.5 und 5.7 Ev (Investigation on K (4 2P3/2) Hg Interaction at Collision Energies from 0.5 to 5.7 Ev).
N85-13589/5/GAR *514,709*

Rotationsinelastic Streuung von He-Atoms an HF-, HCl-, CF4-, SF6-, C2H6- und C2F6-Molekuelen (Rotational Inelastic Scattering of He-Atoms at HF-, HCl-, CF4-, SF6-, C2H6- and C2F6-Molecules).
N85-13590/3/GAR *514,710*

SCHOOL BUILDINGS
College of Idaho Geothermal System, Caldwell, Idaho.
DE85002329/GAR *514,909*

SCHOOLS
Prevalencia de Bocio Endemico en la Poblacion escolar de Bolivia (Prevalence of Endemic Goiter in the School Population of Bolivia),
PB85-137925/GAR *514,505*

Los Libros de Texto Gratuitos de Mexico: El Nacionalismo y la Urgencia de Educar (Mexico's Free Textbooks: Nationalism and the Urgency to Educate).
PB85-138246/GAR *514,536*

SCIENCE AND TECHNOLOGY
Scientific and Technical Information Transfer: Issues and Options,
PB85-150357/GAR *514,437*

SCIENTIFIC SOCIETIES
IFORS (International Federation of Operational Research Societies) in Retrospect, IFORS Twenty-Fifth Anniversary Banquet Speech.
PB85-142974 *515,058*

SCIENTISTS
NASA/ASEE Summer Faculty Fellowship Program, 1984.
N85-13662/0/GAR *514,430*

SCINTILLATION COUNTERS
Scintillator-Fiber Charged Particle Track-Imaging Detector.
N85-13560/6/GAR *515,360*

SEA ICE
MIZEX (Marginal Ice Zone Program): A Program for Mesoscale Air-Ice-Ocean Interaction Experimemts om Arctic Marginal Ice Zones. V. MIZEX 84. Summer Experiment PI (Principal Investigator) Preliminary Reports,
AD-A148 986/3/GAR *514,774*

Dynamics of Coupled Ice-Ocean System in the Marginal Ice Zone: Study of the Mesoscale Processes and of Constitutive Equations for Sea Ice.
N85-13448/4/GAR *514,776*

SEA LEVEL
Alternative to Reduction of Surface Pressure to Sea Level.
N85-13422/9/GAR *514,415*

SEA SURFACE TEMPERATURE
Fontes de Calor Nos Tropicos E Escoamentos Anoma Los de Larga Escala Associadas COM Anomalias de Precipitacao No Nordeste Do Brasil (Heat Sources in the Tropics and Large Scale Flow Anomalies Associated with Precipitation Anomalies in Northeast Brazil).
N85-13421/1/GAR *514,414*

SEALS (MAMMALS)
Hawaiian Monk Seal Population Research, Lisianski Island, 1982.
PB85-148831/GAR *514,734*

SEALS (STOPPERS)
High-Temperature Erosion of Plasma-Sprayed, Yttria-Stabilized Zirconia in a Simulated Turbine Environment.
N85-13045/8/GAR *514,961*

SEDIMENT TRANSPORT
Tidal Phase Control of Sediment Discharge from the Yangtze River.
AD-A148 876/6/GAR *514,735*

Transfer of Particulate Organic Carbon and Nitrogen from the Yangtze River to the Ocean.
AD-A148 931/9/GAR *514,752*

SEDIMENTARY ROCKS
Archean Sedimentation and Tectonics in Southern Africa.
N85-13408/8/GAR *514,748*

SEDIMENTS
Biological Methods for Determining Toxicity of Contaminated Freshwater Sediments to Invertebrates.
PB85-144103/GAR *514,672*

SEISMIC WAVES
Study of Seismicity and Earthquake Hazard in Northern Alabama and Adjacent Parts of Tennessee and Georgia.
NUREG/CR-4058-V1/GAR *514,772*

SEISMOLOGY
Contribuciones Cientificas Para Conmemorar El 75 Aniversario Del Observatorio Del Ebro (Scientific Contributions in Commemoration of Ebro Observatory's 75TH Anniversary).
N85-13308/0/GAR *514,406*

SELECTIVE DISSEMINATION OF INFORMATION
Ocean Services User Needs Assessment. Volume 1. Survey Results, Conclusions and Recommendations.
N85-13445/0/GAR *514,447*

SELECTIVE FADING
Digital Radio Link: Wave Propagation Measurements Using Narrow Band Technique.
N85-13152/2/GAR *515,291*

SELENOLOGY
Activities at the Lunar and Planetary Institute.
N85-13694/3/GAR *514,386*

SEMICONDUCTOR COMPUTER STORAGE
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PB85-855294/GAR *514,844*

SEMICONDUCTORS
Surface and Interfacial Properties of Ga(0.47)In(0.53)As Alloys.
AD-A148 891/5/GAR *515,583*

SEMICONDUCTORS (MATERIALS)
Effect of Barrier Height on Friction Behavior of the Semiconductors Silicon and Gallium Arsenide in Contact with Pure Metals.
N85-13044/1/GAR *514,791*

SENSORY ANALYSIS
Psychophysical Bases for the Sensory Assessment of Rations.
AD-A148 849/3/GAR *514,541*

SEPARATED FLOW
Etude Par Anemometrie Laser d'Ecoulements Decolles sur des Profils d'Aile (Laser Anemometer Study of Separated Flow on Wing Profiles).
N85-12872/6/GAR *514,324*

SEPARATION PROCESSES
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DE85000807/GAR *514,695*

Separation of Helium-Methane Mixtures by Single-Column Pressure Swing Adsorption.
DE85002785/GAR *514,699*

SEQUENTIAL PROBABILITY RATIO TESTS
Monte Carlo Simulation of the Sequential Probability Ratio Test for Radiation Monitoring.
DE85002409/GAR *515,355*

SEQUOYAH-1 REACTOR
Long-Term Automated Surveillance of a Commercial Nuclear Power Plant.
DE85002469/GAR *515,449*

SEROLOGY
Monoclonal Antibodies to Serotype 2 and Serotype 15 Outer Membrane Proteins of Neisseria meningitidis and Their Use in Serotyping.
AD-A148 970/7/GAR *514,581*

SERPENTINE
Mineralogical Characteristics of Asbestos.
PB85-143675 *514,750*

SERVICE ORGANIZATIONS
Employee and Customer Perceptions of Service in Banks: Replication and Extension.
AD-A148 907/9/GAR *514,542*

SEWAGE SLUDGE
Evaluation of Methods to Measure the Acute Toxicity of Sewage Sludge,
PB85-144061/GAR *515,103*

SEWAGE TREATMENT
Biogasification of Walt Disney World Biomass Waste Blend.
PB85-156958/GAR *515,674*

SEXOP PROCESS
Liquid-Liquid Extraction of Trace Level Pesticides from Process Streams.
PB85-152650/GAR *515,113*

SHAPED CHARGES
Asymptotic Formulas for the Motion of Shaped Charge Liners.
DE85000197/GAR *515,498*

SHEAR FLOW
Study of the Structure of Turbulent Shear Flows at Supersonic Speeds and High Reynolds Number.
N85-12865/0/GAR *515,531*

Progress in the Development of a Two-Fluid Model of Turbulence for Near-Wall Flows, Part 1.
N85-13196/9/GAR *515,535*

SHELTERS
Manual for Building Temporary Emergency Shelters (Manual para la Construccion de Abrigos de Emergencia Temporales) (Manuel pour la Construction des Abris D'Urgence Temporaires) (Kitab li bina Ma'Wa Muwaqat fi Halat at Tawara).
PB85-143808/GAR *515,123*

SHETLAND ISLANDS
RRS FREDERICK RUSSELL Cruise 2/83, 14 January - 8 February 1983. Mooring and CTD Work Along the Continental Slope off the Hebrides and Shetland Isles,
PB85-139517/GAR *514,771*

SHIFT PROCESSES
6000 Tpd SRC-I Demonstration Plant Gas Systems. Design Baseline Package, Volume 7.
DE85001240/GAR *515,626*

SHIGELLA DYSENTERIAE
Expression of Lipopolysaccharide 0 Antigen in Escherichia coli K-12 Hybrids Containing Plasmid and Chromosomal Genes from Shigella dysenteriae 1.
AD-A148 942/6/GAR *514,580*

SHIP PERSONNEL
Data Base Development for Ship Readiness Analyses.

AD-A149 036/6/GAR 514,814

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SHIPS
Data Base Development for Ship Readiness Analyses.
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PB84-916408/GAR 515,181

SHOCK
Measurement of Shock Induced Reaction in Rocket Propellants by Nanosecond Infrared Radiometry and Photography.
AD-P004 349/7/GAR 515,701

SHOCK TESTS
Particle Velocity Experiments in Anorthosite and Gabbro.
N85-13407/0/GAR 514,747

SHOCK TUBES
Partikelmitfuehrung in Einem Kompressiblen Wirbel (Particle Entrainment in a Compressible Vortex).
N85-13192/8/GAR 515,532

SHOCK WAVES
Local Stability Analysis for a Planar Shock Wave.
N85-12864/3/GAR 515,530

Experimental Investigation of Shock-Cell Noise Reduction for Dual-Stream Nozzles in Simulated Flight.
N85-13549/9/GAR 515,687

SHOT NOISE
Inequalities for the M/G/Infinity Queue and Related Shot Noise Processes.
AD-A149 015/0/GAR 515,052

SHOWER COUNTERS
Compensation Effects in Hadron Calorimeters.
DE85002594/GAR 515,358

SHROUDS
Experimental Investigation of Two-Dimensional Thrust Augmenting Ejectors, Part 2.
N85-12895/7/GAR 515,685

SIDELOBES
Nulling at Symmetric Pattern Location with Phase-Only Weight Control.
AD-A148 940/0/GAR 514,861

SIERRA LEONE
Socio-Economic Determinants of Food Consumption and Production in Rural Sierra Leone: Application of an Agricultural Household Model with Several Commodities.
PB85-145698/GAR 514,609

SIGNAL CONDITIONING
General Purpose Signal Conditioning.
AD-A149 002/8/GAR 514,863

SIGNAL DETECTION
Methods of Computer-Aided Analysis of Non-Gaussian Noise and Application to Robust Adaptive Detection. Part 2.
AD-A148 879/0/GAR 514,856

SIGNAL MEASUREMENT
Digital Radio Link: Wave Propagation Measurements Using Narrow Band Technique.
N85-13152/2/GAR 515,291

SIGNAL PROCESSING
Object-Oriented Signal Processing Environment: The Knowledge-Based Signal Processing Package.
AD-A148 963/2/GAR 514,809

General Purpose Signal Conditioning.
AD-A149 002/8/GAR 514,863

Elimination of Sensor Artifacts from Infrared Data.
AD-A149 048/1/GAR 515,298

Carrier Acquisition and Tracking by a COSTAS Loop with Automatic Frequency Control.
N85-13149/8/GAR 515,288

SIGNAL TO NOISE RATIO
Probability Density of Signal-to-Noise Ratio in an Improved Adaptive Detector. Part 1.
AD-A148 856/8/GAR 514,855

SIGNAL TO NOISE RATIOS
Transmission de la Television en Modulation de Frequence (Television Transmission in Frequency Modulation).
N85-13146/4/GAR 515,285

SIGNALIZED INTERSECTIONS
Guidelines for Left-Turn Treatments at Signal Controlled Intersections.
PB85-144327/GAR 515,108

SIGNALS
Technique for Reduction of Coherence Function Bias Error.
DE85002593/GAR 515,209

SIGNATURE ANALYSIS
Surveillance des Machines (The Monitoring of Machines).
N85-13253/8/GAR 515,167

SIGNATURES
Digital Signatures - An Update,
PB85-136337/GAR 514,831

SILANES
Development of Acceptance Criteria for Batches of Silane Primer for External Tank Thermal Protection System Bonding Applications.
N85-13043/3/GAR 514,681

SILICA
Organic Complexant-Enhanced Mobility of Toxic Elements in Low-Level Wastes.
DE85002375/GAR 515,410

SILICON
High Resolution Electron Energy Loss Studies of Fermi-Level States of Clean and Metallized Si(111) Surfaces.
AD-A148 933/5/GAR 515,584

Optical Second Harmonic Generation for Surface Studies.
DE85000670/GAR 515,519

Calculation of Si(Li) X-Ray Detector Efficiencies.
DE85002732/GAR 515,211

Effect of Barrier Height on Friction Behavior of the Semiconductors Silicon and Gallium Arsenide in Contact with Pure Metals.
N85-13044/1/GAR 514,791

SILICON CARBIDES
Development and Fabrication of Refractory Bodies for Gas Turbine Engines.
N85-12899/9/GAR 515,686

Preparation of Sinter-Active Silicon Carbide Powders.
N85-12982/3/GAR 514,978

Reactive Sintering of SiC.
N85-13010/2/GAR 514,960

SILICON NITRIDES
Development and Fabrication of Refractory Bodies for Gas Turbine Engines.
N85-12899/9/GAR 515,686

Study of the Pore Structure of Ceramics Prepared by the Slip Casting Method.
N85-13048/2/GAR 514,962

SILICON SOLAR CELLS
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DE85002212/GAR 514,939

SIMULATORS
Modelling, Implementation and Use of a Traffic Simulator for NPDN (Nordic Public Data Network),
PB85-140838/GAR 515,292

SINKING
Marine Accident Report - Capsizing and Sinking of the United States Drillship GLOMAR JAVA SEA in the South China Sea, 65 Nautical Miles South-Southwest of Hainan Island, People's Republic of China, October 25, 1983.
PB84-916408/GAR 515,181

SINTERING
Preparation of Sinter-Active Silicon Carbide Powders.
N85-12982/3/GAR 514,978

Reactive Sintering of SiC.
N85-13010/2/GAR 514,960

SITE SELECTION
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AD-A149 013/5/GAR 514,742

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Low Level Radioactive Waste Disposal Siting: A Social and Technical Plan for Pennsylvania. Volume 2. Socio-economic Analyses.
DE85002331/GAR 515,406

Low Level Radioactive Waste Disposal Siting: A Social and Technical Plan for Pennsylvania. Volume 1. An Overview of Options and Alternatives.
DE85002332/GAR 515,407

SIZE DETERMINATION
Investigations in Array Sizing. Part 1. Accuracy of the Sizing Process.
PB85-151637 515,250

SKILLS
Credentialing of Physicians in the Army.
AD-A149 090/3/GAR 514,525

SLAVERY
Yaughan and Curriboo Plantations: Studies in Afro-American Archaeology.
AD-A148 985/5/GAR 514,508

SLENDER WINGS
Flutter Parametric Studies of Cantilevered Twin-Engine Transport Type Wing with and Without Winglet. Volume 2: Transonic and Density Effect Investigations.
N85-13270/2/GAR 514,340

SLIDING FRICTION
Effect of Barrier Height on Friction Behavior of the Semiconductors Silicon and Gallium Arsenide in Contact with Pure Metals.
N85-13044/1/GAR 514,791

SLIP CASTING
Study of the Pore Structure of Ceramics Prepared by the Slip Casting Method.
N85-13048/2/GAR 514,962

SLOTTED WIND TUNNELS
Local Slot Boundary Condition for Transonic Flow Calculations in Slotted-Wall Test Sections of Wind Tunnels.
N85-12879/1/GAR 515,219

Untersuchung Zur Verbesserung der Transonic-Kanal-Messstrecke des Eidgenoessisches Flugzwerke, Emmen (Investigation for the Improvement of the Transonic Tunnel Working Section of the Emmen Federal Aircraft Works (Switzerland)).
N85-12904/7/GAR 515,221

SLUDGE DISPOSAL
Evaluation of Methods to Measure the Acute Toxicity of Sewage Sludge.
PB85-144061/GAR 515,109

Land Treatment of Petroleum Refinery Sludges.
PB85-148708/GAR 515,112

Biogasification of Walt Disney World Biomass Waste Blend.
PB85-156958/GAR 515,674

SLURRIES
Assessment of Slurry Pump Technology for Direct Coal Liquefaction Demonstration and Pioneer Commercial Plants.
DE85000163/GAR 515,612

SMALL ARMS AMMUNITION
Optimization of Boattails for Small Arms Bullets,
PB85-143758/GAR 515,503

SMALL BUSINESSES
Evaluation of Small Enterprise Programs and Projects: Issues in Business and Community Development.
PB85-140168/GAR 514,471

Ventures in the Informal Sector, and How They Worked Out in Brazil.
PB85-140598/GAR 514,472

SMALL ENTERPRISE PROGRAMS
Evaluation of Small Enterprise Programs and Projects: Issues in Business and Community Development.
PB85-140168/GAR 514,471

SMALL FARMS
Consequences of Small Farm Mechanization on Rural Employment, Incomes and Production in Selected Countries of Asia: Report of a Joint ADC-IRRI (Agricultural Development Council-International Rice Research Institute) Workshop, 14-18 September 1981.
PB85-141646/GAR 514,364

SMALL-SCALE HYDROELECTRIC POWER PLANTS
Shawmut Hydroelectric Redevelopment Project. Final Operation and Maintenance Report.
DE85002670/GAR 514,942

SOBOLEV SPACE
Loeb Sobolev Spaces with Applications to Variational Integrals and Differential Equations.
N85-13544/0/GAR 515,047

SOCIAL ANTHROPOLOGY
Report of an Exploratory Workshop on the Role of Anthropologists and other Social Scientists in Interdisciplinary Teams Developing Improved Food Production Technology.
PB85-142651/GAR 514,352

SOCIAL COMMUNICATION
Objective and Social Factors as Determinants of Task Perceptions and Responses: An Integrative Framework and Empirical Investigation.
AD-A149 081/2/GAR 514,546

SOCIETIES
IFORS (International Federation of Operational Research Societies) in Retrospect, IFORS Twenty-Fifth Anniversary Banquet Speech.
PB85-142974 515,056

SOCIOECONOMIC STATUS
Socio-Economic Determinants of Food Consumption and Production in Rural Sierra Leone: Application of an Agricultural Household Model with Several Commodities.
PB85-145698/GAR 514,609

SODIUM
Optical Second Harmonic Generation for Surface Studies.
DE85000670/GAR 515,519

Laser-Based Diagnostics for Coal Gasification Instrumentation.
DE85002385/GAR 515,652

SODIUM COOLED REACTORS
Loop Simulation Capability for Sodium-Cooled Systems.
PB85-144236/GAR 515,469

SODIUM SULFATES
Interactions Between Corrosion and Creep of Uncoated and Coated Superalloys in Sulfate Melts.
N85-13038/3/GAR 514,995

SOIL ANALYSIS
Simple Assessment Techniques for Soil and Water,
PB85-142669/GAR 514,781

SOIL MOISTURE
Scattering Models in the Microwave Regime.
N85-13361/9/GAR 515,591

SOIL TESTS
XSP(Experimental Static Penetrometer) Cone Penetrometer: A Performance Evaluation.
AD-A148 886/5/GAR *514,777*

Investigation of Density Variation in Triaxial Test Specimens of Cohesionless Soil Subjected to Cyclic and Monotonic Loading.
AD-A148 944/2/GAR *514,778*

SOILS
Investigation of Density Variation in Triaxial Test Specimens of Cohesionless Soil Subjected to Cyclic and Monotonic Loading.
AD-A148 944/2/GAR *514,778*

Radioecological Investigations of Uranium Mill Tailings Systems. Fifth Technical Progress Report, October 1, 1983-September 30, 1984.
DE85000005/GAR *515,422*

Predicting Long-Term Moisture Contents of Earthen Covers at Uranium Mill Tailings Sites.
DE85000777/GAR *515,392*

In Situ gamma-Ray Spectrometric Analysis of Radionuclide Distributions at a Commercial Shallow Land Burial Site.
DE85002376/GAR *515,411*

In Situ Vitrification Pilot-Scale Radioactive Test.
DE85002671/GAR *515,416*

Ice-Soil Mixtures: Visual and Near-Infrared Remote Sensing Techniques.
N85-13358/5/GAR *514,775*

Soil Sampling Apparatus.
PAT-APPL-6-637 241/GAR *514,780*

Soil Improvement, Rainfall Conservation, and Erosion Control in Developing Countries.
PB85-143717/GAR *514,366*

SOLAR ACTIVITY
Solar-Geophysical Data Number 483, November 1984. Part 1 (Prompt Reports). Data for October 1984, September 1984 and Late Data,
PB85-147692/GAR *514,402*

Solar-Geophysical Data Number 483, November 1984. Part 2 (Comprehensive Reports). Data for May 1984, December 1981 and Miscellanea,
PB85-147700/GAR *514,403*

SOLAR ACTIVITY EFFECTS
Contribuciones Cientificas Para Conmemorar El 75 Aniversario Del Observatorio Del Ebro (Scientific Contributions in Commemoration of Ebro Observatory's 75TH Anniversary).
N85-13308/0/GAR *514,406*

SOLAR ARCHITECTURE
Hollow Ceramic Block: Containment of Water for Thermal Storage in Passive Solar Design. Final Technical Report.
DE85000217/GAR *514,952*

SOLAR ARRAYS
Space Know-How, Twenty Years' Space Experience.
N85-12926/0/GAR *515,715*

Autonomous Momentum Management for Space Station.
N85-12931/0/GAR *515,716*

Autonomous Momentum Management for Space Station, Exhibit A.
N85-12933/6/GAR *515,718*

SOLAR COLLECTORS
Fluorescent Dyes for Luminescent Solar Concentrators.
N85-13061/5/GAR *514,919*

Concentrator Optical Characterization Using Computer Mathematical Modelling and Point Source Testing.
N85-13375/9/GAR *514,920*

Software Used with the Flux Mapper at the Solar Parabolic Dish Test Site.
N85-13376/7/GAR *514,921*

SOLAR COOLING SYSTEMS
Solar Heating and Air Conditioning System. Final Report.
DE85000376/GAR *515,064*

High Performance Solar Desiccant Cooling System: Performance Evaluations and Research Recommendations.
DE85000508/GAR *515,065*

Performance of the SERI (Solar Energy Research Institute) Parallel-Passage Dehumidifer.
DE85000509/GAR *515,066*

SOLAR ENERGY
Congressional Budget Request, FY 1985. Volume 2. Energy Supply Research and Development; Nuclear Waste Fund.
DE84009775/GAR *514,875*

Limitations on the Efficiency of the Solar Photoreduction of Carbon.
PB85-151330/GAR *514,717*

SOLAR FURNACES
Simple Model for Predicting the Flux Distribution through the Focal Plane of a Multifaceted-Concentrator Solar Furnace.
AD-A149 063/0/GAR *515,059*

SOLAR HEATING
Research Priorities for Improving the Effectiveness of Active Solar Hot Water and Space Conditioning Systems.
PB85-153443/GAR *515,076*

SOLAR HEATING SYSTEMS
Solar Heating and Air Conditioning System. Final Report.
DE85000376/GAR *515,064*

Solar Energy System Case Study, Oakmead Industries, Santa Clara, California.
DE85002078/GAR *515,069*

SOLAR PHYSICS
Research and Technology, 1984: Marshall Space Flight Center.
N85-13765/1/GAR *514,433*

SOLAR PROCESS HEAT
Oil Field Data and Industry Opinions Important to the Commercialization of Solar Thermal Enhanced Oil Recovery.
DE85002153/GAR *514,760*

Investment Evaluation of Solar Thermal Enhanced Oil Recovery (STEOR) Systems for Project Starts in the Years 1982 and 1986.
DE85002164/GAR *514,762*

Technical Support Services for the Solar Thermal Enhanced Oil Recovery Program. Volume 1. Program Summary Report, February 9-May 31, 1981.
DE85002165/GAR *514,763*

SOLAR RADIO BURSTS
Solar Radio Bursts, Proton Events and Geomagnetic Activity,
AD-A149 018/4/GAR *514,385*

SOLAR RADIO EMISSION
Solar Radio Bursts, Proton Events and Geomagnetic Activity,
AD-A149 018/4/GAR *514,385*

SOLAR RECEIVERS
Sol-Gel-Derived AR Coatings for Solar Receivers.
DE85000192/GAR *514,896*

Molten Salt Solar Receiver Subsystem Research Experiment. Phase 1, Final Report. Volume 1. Executive Summary. Volume 2. Technical.
DE85000874/GAR *514,903*

SOLAR REFLECTORS
Accelerated Aging of Aluminized Acrylic Solar Mirror Materials.
DE85002683/GAR *514,911*

SOLAR STORMS
Interplanetary Radio Storms. 2: Emission Levels and Solar Wind Speed in the Range 0.05-0.8 AU.
N85-13761/0/GAR *514,400*

SOLAR THERMAL POWER PLANTS
Solar Thermal Technology. Annual Evaluation Report, Fiscal Year 1983.
DE84013029/GAR *514,877*

SOLAR WATER HEATERS
Solar Energy System Case Study, Oakmead Industries, Santa Clara, California.
DE85002078/GAR *515,069*

SOLAR WATER HEATING
Research Priorities for Improving the Effectiveness of Active Solar Hot Water and Space Conditioning Systems.
PB85-153443/GAR *515,076*

SOLAR WIND
Magnetohydrodynamic and Gasdynamic Theories for Planetary Bow Waves.
N85-13760/2/GAR *514,399*

Interplanetary Radio Storms. 2: Emission Levels and Solar Wind Speed in the Range 0.05-0.8 AU.
N85-13761/0/GAR *514,400*

SOLID ELECTROLYTES
Development and Testing of Thin Film Cells for High Temperature Water Vapor Electrolysis.
N85-13001/1/GAR *514,702*

SOLID LUBRICANTS
High Temperture, High Wear Resistant Solid Lubricants. April 1983-February 1985 (Citations from FLUIDEX Data Base).
PB85-854859/GAR *515,008*

SOLID PROPELLANT ROCKET ENGINES
Report on AGARD Meeting Hazards Studies for Solid Propellant Rocket Motors,
AD-P004 340/6/GAR *515,695*

SOLID PROPELLANTS
Effects of Perforation L/D Ratio and Slotting on Stick Propellant Combustion.
AD-A148 854/3/GAR *515,490*

Recovery of Damaged Solid Propellants by Interrupting Burning and Crack-Propagaton Processes,
AD-P004 343/0/GAR *515,698*

Antiplane Cracks in Solid Propellants,
AD-P004 344/8/GAR *515,699*

SOLID ROCKET PROPELLANTS
Report on AGARD Meeting Hazards Studies for Solid Propellant Rocket Motors,
AD-P004 340/6/GAR *515,695*

Transition to Detonation from Rapid-Compression (Ramp-Waves) Generated in a Burning Porous Bed,
AD-P004 345/5/GAR *515,700*

Measurement of Shock Induced Reaction in Rocket Propellants by Nanosecond Infrared Radiometry and Photography,
AD-P004 349/7/GAR *515,701*

SOLID STATE ELECTRONICS
Filter Reflection Image Guide Oscillator and Solid State Line Scanning Device.
PAT-APPL-6-679 970/GAR *514,865*

SOLID WASTE DISPOSAL
Fail-Safe Devices for the Prevention of Hazardous Material Spills.
PB85-138642/GAR *515,236*

Standard Operating Procedures for Conducting Sampling and Sample Bank Audits,
PB85-143279/GAR *515,238*

Ponding of Effluents from Fossil Fuel Steam Electric Power Plants.
PB85-144244/GAR *515,106*

SOLID WASTES
Solid Waste Management Options for Naval Installations on Guam.
AD-A148 947/5/GAR *515,081*

Etat des Connaissances Relatives a l'Utilisation en Remblais Routiers de Cendres Volantes de Fraiche Production Provenant d'une ou de Plusieurs Centrales Electriques (Study of Physical Characteristics of Freshly Produced Fly-Ash from the Exhaust Gases of Coal-Fired Power Stations),
PB85-139426/GAR *515,094*

Waste Water Pollution Management and Control in the Petrochemical and Plastics Processing Industry,
PB85-145043/GAR *515,005*

Biogasification of Walt Disney World Biomass Waste Blend.
PB85-156958/GAR *515,674*

Biological Gasification of Renewable Resources.
PB85-156966/GAR *515,675*

Anaerobic Digestion of Biomass: Status Summary and Research and Development Needs, 1983 (Condensed Version).
PB85-159457/GAR *515,676*

SOLIDS
Theta Pinch Discharges for Solids Vaporization and Elemental Chemical Analysis. Technical Progress Report.
DE85002968/GAR *514,700*

Obturateur a Effet Kerr Optique. Rapport de Synthese Finale (Obturator with Optic Kerr Effect. Final Report),
PB85-137289/GAR *514,711*

SOLUBILITY
Saponin-Based Polyether Polyols.
PAT-APPL-6-548 849/GAR *514,643*

SOLUTIONS
Obturateur a Effet Kerr Optique. Rapport de Synthese Finale (Obturator with Optic Kerr Effect. Final Report),
PB85-137289/GAR *514,711*

SOLVENT EXTRACTION
Liquid-Liquid Extraction of Trace Level Pesticides from Process Streams.
PB85-152650/GAR *515,113*

SONAR ARRAYS
Surface Projections of Array Beam Patterns.
AD-A148 999/6/GAR *515,278*

Measurement of the Depth of a Sonar Array.
AD-A149 056/4/GAR *515,279*

SOUND TRANSMISSION
Transmission Analysis for the Use of 2-4 PSK (Phase Shift Keying) Modulation in Satellite Broadcasting.
N85-13151/4/GAR *515,290*

SOUNDING ROCKETS
Launch Summary for 1978 - 1982.
N85-12924/5/GAR *515,722*

SOUTH AFRICA
Role of Mining in the South African Economy,
PB85-139228/GAR *514,467*

Register of Products Manufactured in South Africa, 1979 (Updated to 1982) (Register van Produkte in Suid-Afrika Vervaardig, 1979 (Bygewerk tot 1982)).
PB85-139442/GAR *514,452*

Occupancy, Income and General Statistics of South African Hotels for 1979.
PB85-141042/GAR *514,474*

SOUTHEAST REGION (ILLINOIS)
Structural Geology of Southeastern Illinois and Vicinity.
NUREG/CR-4036/GAR *514,744*

SPACE EXPLORATION
Mission Science Value-Cost Savings from the Advanced Imaging Communication System (AICS) (Advanced Imaging Communication System).
N85-12905/4/GAR *515,283*

Mission Interstellaire (Interstellar Mission).
N85-12916/1/GAR *515,705*

SPACE FLIGHT
Human Role in Space. Volume 1. Executive Summary.
N85-13473/2/GAR *515,709*

SPACE PLATFORMS
Selected Tether Applications in Space: An Analysis of Five Selected Concepts.
N85-12921/1/GAR *515,706*

Autonomous Momentum Management for Space Station.
N85-12931/0/GAR *515,716*

Autonomous Momentum Management for Space Station, Exhibit A.
N85-12933/6/GAR *515,718*

KEYWORD INDEX

SPACE PROBES
Launch Summary for 1978 - 1982.
N85-12924/5/GAR *515,722*

SPACE SHUTTLE MAIN ENGINE
Analysis of Physical-Chemical Processes Governing SSME Internal Fluid Flows.
N85-12859/3/GAR *515,696*

SPACE SHUTTLE ORBITERS
Space Shuttle Orbiter Trimmed Center-of-Gravity Extension Study, Volume 8: Effects of Configuration Modifications on the Aerodynamic Characteristics of the 140 a/B Orbiter at a Mach Number of 5.97.
N85-12867/6/GAR *515,712*

Selected Tether Applications in Space: An Analysis of Five Selected Concepts.
N85-12921/1/GAR *515,706*

SPACE SHUTTLES
Development of Computational Fluid Dynamics at NASA Ames Research Center.
N85-12868/8/GAR *514,320*

Les Systemes de Lancements (Launching Systems).
N85-12917/9/GAR *515,721*

Oil-Flow Study of a Space Shuttle Orbiter Tip-Fin Controller.
N85-12920/3/GAR *515,714*

SPACE STATIONS
Technologies for Space Station Autonomy.
N85-12906/2/GAR *515,713*

Selected Tether Applications in Space: An Analysis of Five Selected Concepts.
N85-12921/1/GAR *515,706*

Definition of Technology Development Missions for Early Space Station Satellite Servicing. Volume 2. Technical.
N85-12923/7/GAR *515,708*

Autonomous Momentum Management for Space Station, Exhibit A.
N85-12933/6/GAR *515,718*

Regenerative Fuel Cell Energy Storage System for a Low Earth Orbit Space Station.
N85-13371/8/GAR *514,945*

Research and Technology, 1984: Marshall Space Flight Center.
N85-13765/1/GAR *514,433*

SPACE TRANSPORTATION SYSTEM
Selected Tether Applications in Space: An Analysis of Five Selected Concepts.
N85-12921/1/GAR *515,706*

SPACEBORNE EXPERIMENTS
Research and Technology, 1984: Marshall Space Flight Center.
N85-13765/1/GAR *514,433*

SPACEBORNE PHOTOGRAPHY
Processing of Global Area Coverage (GAC) Data of the TIROS-N/NOAA Series Polar Orbiters.
AD-A148 992/1/GAR *514,411*

SPACECRAFT
Space Shuttle Orbiter Trimmed Center-of-Gravity Extension Study, Volume 8: Effects of Configuration Modifications on the Aerodynamic Characteristics of the 140 a/B Orbiter at a Mach Number of 5.97.
N85-12867/6/GAR *515,712*

Plastics and Elastomers: Space Applications. 1977-January 1985 (Citations from the Rubber and Plastics Research Association Data Base).
PB85-855005/GAR *515,016*

SPACECRAFT EQUIPMENT
Definition of Technology Development Missions for Early Space Station Satellite Servicing. Volume 1. Executive Summary.
N85-12922/9/GAR *515,707*

SPACECRAFT GUIDANCE
Analise E Simulacao de Um Sistema Inercial (Strapdown) de Determinacao de Altitude Auxiliado Por Estimacao Adaptativa DA Deriva (Analysis and Simulation of an Inertial System (Strapdown) for Auxiliary Attitude Determination by Adaptive Drift Estimation).
N85-12882/5/GAR *515,303*

SPACECRAFT LAUNCHING
Les Systemes de Lancements (Launching Systems).
N85-12917/9/GAR *515,721*

Launch Summary for 1978 - 1982.
N85-12924/5/GAR *515,722*

SPACECRAFT POWER SUPPLIES
Space Power Distribution System Technology. Volume 3. Test Facility Design.
N85-12936/9/GAR *515,719*

SPACECRAFT PROPULSION
Mission Interstellaire (Interstellar Mission).
N85-12916/1/GAR *515,705*

SPACECRAFT TRACKING
Ocean Services User Needs Assessment. Volume 1. Survey Results, Conclusions and Recommendations.
N85-13445/0/GAR *514,447*

SPACELAB PAYLOADS
Design, Fabrication and Delivery of a Spacelab Neutral Buoyancy Instrument Pointing System (IPS) Mockup.
N85-12934/4/GAR *514,532*

SPATIAL RESOLUTION
Investigation of Several Aspects of LANDSAT 4/5 Data Quality.
N85-13357/7/GAR *514,823*

SPECIFICATIONS
Apollo System Requirements Specification.
N85-13150/6/GAR *515,289*

L'Organisation de la Qualite (Quality Organization).
N85-13257/9/GAR *515,255*

ESA(European Space Agency) Product Assurance Specification System: Explanatory Note.
N85-13259/5/GAR *515,720*

Technical Specifications for Waterford Steam Electric Station, Unit No. 3, Docket No. 50-382, Appendix A to License No. NPF-26.
NUREG-0973/GAR *515,462*

SPECIMEN GEOMETRY
Instrumented Impact Testing Machine with Reduced Specimen Oscillation Effects.
N85-13218/1/GAR *515,227*

SPECKLE PATTERNS
Automatic Analysis of Speckle Photographs by Microcomputer,
PB85-136378/GAR *515,235*

SPECKLE PHOTOGRAPHY
Automatic Analysis of Speckle Photographs by Microcomputer,
PB85-136378/GAR *515,235*

SPECTRAL EMISSION
Scattering Models in the Microwave Regime.
N85-13361/9/GAR *515,591*

SPECTRAL SIGNATURES
Ice-Soil Mixtures: Visual and Near-Infrared Remote Sensing Techniques.
N85-13358/5/GAR *514,775*

SPECTROMETERS
Study of Instrument Design Options for the Columbus Spectroscopy Mission.
N85-13205/8/GAR *515,223*

SPECTRUM ANALYZERS
Development of a Prototype Wavevector-Frequency Spectral Analysis System.
AD-A148 871/7/GAR *515,512*

SPENT FUEL CASKS
Comparison of Structural Computer Programs Used for the Analysis of Spent Fuel Shipping Casks.
DE85002444/GAR *515,385*

SPENT FUEL STORAGE
Particulate and Gas Release from Light-Water-Reactor (LWR) Fuel Rods Stored in Inert and Dry Air Atmospheres.
NUREG/CR-4056/GAR *515,420*

SPENT SHALES
Environmental Chemistry of Oil Shale Development. Interim Technical Progress Report, January 1-September 30, 1984.
DE85001408/GAR *515,628*

SPILLWAYS
Spillway Deflectors at Bonneville, John Day and McNary Dams on Columbia River, Oregon-Washington and Ice Harbor, Lower Monumental and Little Goose Dams on Snake River, Washington. Hydraulic Model Investigation.
AD-A148 863/4/GAR *515,078*

SPIN ORIENTATION
Collective Effects in Spin Polarized Plasmas.
DE85002702/GAR *515,572*

SPIN STABILIZED AMMUNITION
Hypothetical Zero Yaw Drag Trajectory of Spinning Projectiles between M = 5 and M = 10.
AD-A148 899/8/GAR *515,492*

SPRAYED COATINGS
Infrared-Thermal Wave Scanner for NDE of Naval Thermal Spray Coatings.
DE85002237/GAR *515,205*

Plasma and Flame Sprayed Coatings. 1980-February 1985 (Citations from the Engineering Index Data Base).
PB85-854982/GAR *514,969*

SPUTTERING
Ion Contrasting Chamber for Discrimination of Grains and Textures.
N85-13036/7/GAR *514,993*

Reactive Ion Etching and Reactive Sputter Etching. 1976-February 1985 (Citations from the INSPEC: Information Services for the Physics and Engineering Communities Data Base).
PB85-855047/GAR *515,160*

SRC PROCESS
General Engineering Specifications for 6000 Tpd SRC-I Demonstration Plant.
DE85000031/GAR *515,609*

General Engineering Specifications for 6000 Tpd SRC-I Demonstration Plant.
DE85000032/GAR *515,610*

General Engineering Specifications for 6000 Tpd SRC-I Demonstration Plant.
DE85000033/GAR *515,611*

General Engineering Specifications for 6000 Tpd SRC-I Demonstration Plant.
DE85000794/GAR *515,621*

6000 Tpd SRC-I Demonstration Plant Gas Systems. Design Baseline Package. Volume 10.
DE85001217/GAR *515,625*

6000 Tpd SRC-I Demonstration Plant Gas Systems. Design Baseline Package, Volume 7.
DE85001240/GAR *515,626*

6000 Tpd SRC-I Demonstration Plant Gas Systems. Design Baseline Package. Volume 4.
DE85001682/GAR *515,629*

STABILITY TESTS
Local Stability Analysis for a Planar Shock Wave.
N85-12864/3/GAR *515,530*

STABILIZATION
In Situ Vitrification Pilot-Scale Radioactive Test.
DE85002671/GAR *515,416*

STAGNATION FLOW
Physics on Aircraft Wakes.
N85-12871/8/GAR *514,323*

Laminar Jet Issuing into Stagnant Surroundings.
N85-13200/9/GAR *515,538*

STAINLESS STEEL-316
Design and Use of Nonstandard Tensile Specimens for Irradiated Materials Testing.
DE85001071/GAR *514,987*

STAINLESS STEELS
Tensile and Creep Properties of DT2906: Dispersion-Strengthened Ferritic Steel Tubes,
PB85-139335/GAR *514,999*

STANDARD METROPOLITAN STATISTICAL AREAS
Metropolitan Statistical Areas (Including CMSAs (Consolidated Metropolitan Statistical Areas), PMSAs (Primary Metropolitan Statistical Areas), and NECMAs (New England County Metropolitan Areas)). Category: Data Standards and Guidelines. Subcategory: Representations and Codes.
FIPS PUB 8-5/GAR *514,820*

STANDARD REFERENCE MATERIALS
Analytical Reference Standards and Supplemental Data: The Pesticides and Industrial Chemicals Repository.
PB85-143766/GAR *514,714*

STANDARDS
Metropolitan Statistical Areas (Including CMSAs (Consolidated Metropolitan Statistical Areas), PMSAs (Primary Metropolitan Statistical Areas), and NECMAs (New England County Metropolitan Areas)). Category: Data Standards and Guidelines. Subcategory: Representations and Codes.
FIPS PUB 8-5/GAR *514,820*

Maps Depicting Nonattainment Areas Pursuant to Section 107 of the Clean Air Act - 1984,
PB85-140630/GAR *515,097*

Standard Operating Procedures for Conducting Sampling and Sample Bank Audits,
PB85-143279/GAR *515,238*

Guidance for the Reregistration of Manufacturing-Use and Certain End-Use Pesticide Products Containing Dialate.
PB85-144814/GAR *514,368*

Report on the Status of the Development of the IEEE (Institute of Electrical and Electronics Engineers) Standard for Software Verification Plans (P1012).
PB85-151769 *514,839*

STANFORD 20-GEV LINAC
Single-Cavity SLED Device.
DE85002587/GAR *515,556*

STANFORD LINEAR COLLIDER
Notes on the RF System for the SLC Positron Source.
DE85002628/GAR *515,558*

STARK EFFECT
Dynamic Stark-Effect in Thallium,
PB85-143204/GAR *514,712*

STARS
Documentation for the Machine-Readable Version of the MK Classification Extension Catalogue Morris-Kennedy (1983).
N85-13491/4/GAR *514,382*

Documentation for the Machine-Readable Version of the Perth 75: A Catalogue of Positions of 2589 FK4 and Fk4s Stars (Nikoloff and Hog 1982).
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N85-13493/0/GAR *514,384*

STATE LAW
Information Report on State Legislation, Vol. 10, No. 7, December 1984.
NUREG/BR-0025-85/01/GAR *514,499*

STATIC TESTS
Static Jet Noise Test Results of Four 0.35 Scale-Model QCGAT(Quiet Clean General Aviation Turbofan) Mixer Nozzles.
N85-13551/5/GAR *515,689*

STATIONARY SOURCES
Technical Assistance Document for Monitoring Sulfuric Acid Vapor from Stationary Sources,
PB85-143261/GAR *514,713*

Proceedings: National Symposium on Recent Advances in Pollutant Monitoring of Ambient Air and Stationary Sources, Held at Radison Plaza Raleigh Hotel, on May 8-10, 1984.
PB85-144053/GAR 515,240

STATISTICAL ANALYSIS

Essai 17.206: Statistique sur les Caracteristics de Base des Composites Carbone-Epoxy (Traction) (Test Report No. 17.208: Statistics of the Basic Characteristics of Carbon-Epoxy Composites).
N85-12979/9/GAR 514,975

Entwurf und Implementierung Eines Modularen Programmsystems Zur Durchfuehrung Statistischer Analysen (Design and Implementation of a Modular Program System for Statistical Analyses).
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STEADY FLOW

Numerical Calculation of Steady Turbulent Flows in Adverse Pressure Gradients.
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STEAM

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STEAM GENERATORS

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STEELS

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Effect of Temperature on the Stress-Relaxation Response of a Pressure Vessel Steel.
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Neutron Spectral Characterization for the Fifth Heavy Section Steel Technology (HSST) Irradiation Series. Simulator Experiments.
NUREG/CR-4031/GAR 514,991

STELLAR ATMOSPHERES

Outer Atmospheres of Giant and Supergiant Stars.
N85-13703/2/GAR 514,391

RS CV sub n Binary Systems.
N85-13704/0/GAR 514,392

STELLAR CORONAS

Outer Atmospheres of Giant and Supergiant Stars.
N85-13703/2/GAR 514,391

STELLAR MODELS

Time Dependent Effects at the Foot of the Chromosphere.
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STELLAR MOTIONS

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STELLAR SPECTRA

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Calculation of Stellarator Equilibria in Vacuum Flux Surface Coordinates.
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AD-A149 084/6/GAR 514,690

STEROIDS

Modulation of the Cytosolic Androgen Receptor in Striated Muscle by Sex Steroids.
N85-13468/2/GAR 514,642

STICK PROPELLANTS

Effects of Perforation L/D Ratio and Slotting on Stick Propellant Combustion.
AD-A148 854/3/GAR 515,490

STIMULATION (PHYSIOLOGY)

Effects of Tempo and Intensity on Hyperactive Children.
AD-A148 934/3/GAR 514,544

STIRLING CYCLE

Stirling Material Technology.
N85-13007/8/GAR 515,692

Overview of Waste Heat Utilization Systems.
N85-13692/7/GAR 514,922

STRAIN ENERGY METHODS

Toughening Mechanism in Elastomer-Modified Epoxy Resins, Part 2.
N85-13046/6/GAR 515,018

Stress Intensity Factors for Corner Cracks at Holes Located Near an Edge.
N85-13279/3/GAR 515,579

STRAPDOWN INERTIAL GUIDANCE

Analise E Simulacao de Um Sistema Inercial (Strapdown) de Determinacao de Atitude Auxiliado Por Estimacao Adaptativa DA Deriva (Analysis and Simulation of an Intertial System (Strapdown) for Auxiliary Attitude Determination by Adaptive Drift Estimation).
N85-12682/5/GAR 515,303

STRAPPED DOWN SYSTEMS

Alignment Fixture for a Two-Degree-of-Freedom (TDF) Gyroscope.
AD-A148 885/7/GAR 515,300

STRATEGIC AIR COMMAND

Impact of the AT and T (American Telephone and Telegraph) Divestiture on the Strategic Air Command.
AD-A148 957/4/GAR 515,281

STRATEGIC AREAS

Africa: A Strategic Factor in the Strategic Equation of the World.
AD-A148 983/0/GAR 514,496

STRATEGIC WARFARE

AirLand Battle Execution -- Some Implications of Deep Attack.
AD-A148 948/3/GAR 515,269

STRATEGIES

Regional Investment Strategies: Information and Analytical Tools.
PB85-144335/GAR 514,482

STRATIFIED FLOW

Richardson Number Criterion for the Nonlinear Stability of Three-Dimensional Stratified Flow.
AD-A148 971/5/GAR 515,528

STREAMS

Stages and Discharges of the Mississippi River and Tributaries and Other Watersheds in the New Orleans District for 1980.
AD-A148 862/6/GAR 514,751

STRENGTH (MECHANICS)

Comprehensive Study on Sublaminate Crack Growth Stability and Its Effects on the Load-Carrying Capacity.
AD-A149 037/4/GAR 514,971

STRENGTH (PHYSIOLOGY)

Assessment of Muscle Strength and Prediction of Lifting Capacity in U.S. Army Personnel,
AD-A148 846/9/GAR 514,659

STRESS CORROSION

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Evaluation of Welded and Repair-Welded Stainless Steel for Light Water Reactor (LWR) Service: Compositional Effects on the Sensitization of Austenitic Stainless Steels.
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STRESS DISORDERS

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STRESS INTENSITY FACTORS

Stress Intensity Factors for Corner Cracks at Holes Located Near an Edge.
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STRESS (PHYSIOLOGY)

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STRESS (PSYCHOLOGY)

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STRESS RELAXATION

Effect of Temperature on the Stress-Relaxation Response of a Pressure Vessel Steel.
NUREG/CR-3726/GAR 514,989

STRESSES

Bulletin of the Faculty of Engineering, Hokkaido University, No. 123.
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STRIP TRANSMISSION LINES

Coaxial Cavity Gunn Oscillator Using Probe Coupled Microstrip.
PAT-APPL-6-679 972/GAR 514,867

STRONTIUM 90

In Situ gamma-Ray Spectrometric Analysis of Radionuclide Distributions at a Commercial Shallow Land Burial Site.
DE85002376/GAR 515,411

In Situ Vitrification Pilot-Scale Radioactive Test.
DE85002671/GAR 515,416

STRUCTURAL ANALYSIS

Structures to Resist the Effects of Accidental Explosions. Volume 3. Principles of Dynamic Analysis.
AD-A148 895/6/GAR 515,190

Bulletin of the Faculty of Engineering, Hokkaido University, No. 123.
N85-13075/5/GAR 514,446

STRUCTURAL BEAMS

General Engineering Specifications for 6000 Tpd SRC-I Demonstration Plant.
DE85000032/GAR 515,610

STRUCTURAL FAILURE

Formulations et Methodes de Resolution des Problemes Classiques du Flambage Statique (Formulation and Solution Methods for Classical Problems of Static Buckling).
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Deformations Non-Lineaires et Flambage Statique Lineaire de Structures Soumises a des Forces de Pression (Nonlinear Deformation and Static Linear Buckling of Structures under Pressure).
N85-13281/9/GAR 515,581

STRUCTURAL TIMBER

Tropical Timbers of the World,
PB85-156917/GAR 514,381

STRUCTURAL VIBRATION

Response Measurements for Two Building Structures Excited by Noise from a Large Horizontal Axis Wind Turbine Generator.
N85-13552/3/GAR 515,191

STRUCTURES

Structural Design Guidelines for Heliports.
AD-A148 967/3/GAR 514,345

SUBSAHARAN AFRICA

Soviet Mid-Term Objectives, Strategies, and Prospects in Sub-Saharan Africa.
AD-A148 941/8/GAR 514,495

Research on Agricultural Development in Sub-Saharan Africa: A Critical Survey.
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SUBSTITUTES

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N85-13049/0/GAR 514,979

SUBSTRUCTURES

Full-Scale Crash-Test Evaluation of Two Load-Limiting Subfloors for General Aviation Airframes.
N85-13267/8/GAR 514,338

SUBSURFACE STRUCTURES

Development of Soft Excavation Techniques, Phases 2 and 2A.
PB85-152817/GAR 515,124

SUDAN

Sudan Fertility Survey, 1979: A Summary of Findings.
PB85-138030/GAR 514,550

SUGAR CROPS

Ethanol from Sugar Crops: A Critical Review,
PB85-140176/GAR 515,671

SULFUR

Sulfur Activation in Electric Pole Insulators in Hiroshima.
DE85001169/GAR 515,266

Laser-Based Diagnostics for Coal Gasification Instrumentation.
DE85002385/GAR 515,652

SULFUR DIOXIDE

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SULFUR FLUORIDES

Spark Decomposition of SF sub 6 ; Toxicity of by-Products.

DE85000161/GAR 514,692

SULFUR ISOTOPES
Mound Activities in Chemical and Physical Research: January-June 1984.
DE85002552/GAR 515,340

SULFURIC ACID
Technical Assistance Document for Monitoring Sulfuric Acid Vapor from Stationary Sources,
PB85-143261/GAR 514,713

SUN
Time Dependent Effects at the Foot of the Chromosphere.
N85-13762/8/GAR 514,401

SUPERCONDUCTING MAGNETS
Generalized Multidemensional Propagation Velocity Equations for Pool-Boiling Superconducting Windings.
DE85000926/GAR 514,786

Magnet Cold Mass High Load Supports Thermal Response and Performance Design Correlation.
DE85000964/GAR 515,318

Vapor Cooled Lead and Stacks Thermal Performance and Design Analysis by Finite Difference Techniques.
DE85001038/GAR 515,319

SUPERGIANT STARS
Outer Atmospheres of Giant and Supergiant Stars.
N85-13703/2/GAR 514,391

SUPERSONIC FLOW
Study of the Structure of Turbulent Shear Flows at Supersonic Speeds and High Reynolds Number.
N85-12865/0/GAR 515,531

Adaptation de Parois a Mach 1.2 (Wall Adaptation at Mach 1.2).
N85-12873/4/GAR 515,213

SUPERVISORS
Leadership Development in the Civilian Work Force.
AD-A148 955/8/GAR 514,518

SUPPORT SYSTEMS
Human Role in Space. Volume 2. Research Analysis and Technology Report.
N85-13474/0/GAR 515,710

SUPPORTS
Magnet Cold Mass High Load Supports Thermal Response and Performance Design Correlation.
DE85000964/GAR 515,318

SURFACE ACTIVE SUBSTANCES
Reaction of Oxygen-Nitrogen Mixtures with Granular Activated Carbons below the Spontaneous Ignition Temperature.
AD-A149 041/6/GAR 514,689

SURFACE CHEMISTRY
Characterization of Surfaces Using Electron and Photon Stimulated Desorption.
PB85-151587 514,718

Vibrational Excitation, Harpooning, and Sticking in Molecule-Surface Collisions.
PB85-151603 514,719

Importance of Active Sites for Char Gasification in Oxygen (Air) and Carbon Dioxide.
PB85-155964/GAR 515,673

SURFACE ROUGHNESS EFFECTS
Proposal for Wall Function for Friction and Heat Transfer in the Presence of Roughness and Mass Transfer.
N85-13198/5/GAR 515,537

SURFACES
Optical Second Harmonic Generation for Surface Studies.
DE85000670/GAR 515,519

Solar-Assisted Hydrogen Generation by Photoelectrocatalysis.
PB85-149706/GAR 514,730

SURGERY
Frequency Dependence of Effective Nasal Resistance.
PB85-144095 514,591

SURVEILLANCE
Extracts from Symposium Countersurveillance '83 Held at Melbourne, Australia on 27 and 28 April, 1983.
AD-A149 066/1/GAR 515,299

Surveillance Receiver/Recorders.
PB85-144848 514,560

SURVEY MONITORS
Use of a Commercial Ranging System in Field Surveys of Radioactively Contaminated Sites.
DE85002364/GAR 515,354

SUSPENDING (HANGING)
Methode d'Essais de Telecabines (Test Methods for Cable Cars).
N85-13282/7/GAR 515,228

SWITCHES
High-Temperature Optically Activated GaAs Power Switching for Aircraft Digital Electronic Control.
N85-12901/3/GAR 514,337

SWITZERLAND
Survey of Energy Consumption in Switzerland in 1983.
DE84770509/GAR 514,891

SYMBOLIC PROGRAMMING
Knowledge based Programming Applications,
AD-A148 913/7/GAR 514,806

SYMBOLS
United States Trademarks - Registered.
PB85-914000/GAR 514,456

SYMPOSIA
Product Performance Agreement Center Proceedings Held at Dayton, Ohio on 18-19 June 1984.
AD-A148 878/2/GAR 515,263

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AD-A148 914/5/GAR 514,646

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AD-A149 025/9/GAR 514,329

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SYNCHROTRON RADIATION
Materials Science with Synchrotron Radiation: The Case for a Superprobe.
DE85001893/GAR 515,204

SYNCHROTRON RADIATION SOURCES
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DE85002551/GAR 515,555

SYNTHESIS (CHEMISTRY)
Some Addition and Complexation Reactions of a Silylated Amino(Methylene)Phosphine.
AD-A149 042/4/GAR 514,683

Synthesis of Some Highly Silylated Aminophosphines and Their Reactions with Carbon Tetrachloride.
AD-A149 066/3/GAR 514,684

Method for Making Heterocyclic Block Copolymers.
PAT-APPL-6-610 912/GAR 514,685

SYNTHETIC FUELS
Development and Evaluation of Supercritical Fluid Chromatography/Mass Spectrometry for Polar and High Molecular Weight Coal Components.
DE85000827/GAR 515,623

SYNTHETIC FUELS INDUSTRY
Ambient Monitoring of Pollutants Around Synfuel Plants.
PB85-142701/GAR 515,100

SYRIA
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SYRINGIC ACID/ (ETHYLHEXYL-ESTER)
Biocompatible Cementitious Dental Compositions.
PATENT-4 486 179 514,956

SYSTEMS APPROACH
Use of Meta-Level Control for Coordination in a Distributed Problem Solving Network,
AD-A148 915/2/GAR 514,423

Coordination in a Distributed Problem Solving Network,
AD-A148 925/1/GAR 514,425

SYSTEMS ENGINEERING
Distributed Vehicle Monitoring Testbed: A Tool for Investigating Distributed Problem Solving Networks,
AD-A148 917/8/GAR 514,424

System Status Display Information.
N85-12889/0/GAR 514,341

TAFFS (THE ARMY FUNCTIONAL FILES SYSTEM)
Pilot of the Modern Army Record-Keeping System (MARKS) at 5th Battalion, 73rd Armored Regiment, 194th Armored Brigade, Fort Knox, Kentucky.
AD-A148 974/9/GAR 514,519

TAHYNA VIRUS
Mechanisms of Bunyavirus Virulence: A Genetic Approach.
AD-A149 058/0/GAR 514,635

TANTALUM
Atomic Structure and Optical Constants of (001) Tantalum.
PB85-151629 515,525

TANZANIA
Environmenal Sanitation Master Plan for Training and Education in Tanzania.
PB85-143022/GAR 515,101

TARGET ACQUISITION
Evaluation of an Advanced Combat Vehicle Identification (CVI) Training Program (Masking): A New Approach to Target Acquisition Training.
AD-A148 911/1/GAR 514,516

TARGET RECOGNITION
Evaluation of an Advanced Combat Vehicle Identification (CVI) Training Program (Masking): A New Approach to Target Acquisition Training.
AD-A148 911/1/GAR 514,516

TARTARIC ACID
Influence of Individual Reflections on the Precision of Parameter Estimates in Least Squares Refinement.
DE85000830/GAR 515,521

TASK DESIGN
Objective and Social Factors as Determinants of Task Perceptions and Responses: An Integrative Framework and Empirical Investigation.
AD-A149 081/2/GAR 514,546

TAX CREDITS
Modeling Tax Credit Incentives for Business Investment in Selected Energy Conservation and Production Technologies.
DE85003168/GAR 514,918

TEACHING MACHINES
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TECHNOLOGICAL FORECASTING
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PB85-138824/GAR 515,155

Computerized Manufacturing Automation: Employment, Education, and the Workplace. Volume 2. Working Papers. Part C: Individual Education and Training Case Studies.
PB85-138832/GAR 515,156

Medical Technology and Costs of the Medicare Program.
PB85-146215/GAR 514,596

Windows for Innovation: A Story of Two Large-Scale Technologies,
PB85-150340/GAR 515,294

TECHNOLOGY TRANSFER
Scientific and Technical Information Transfer: Issues and Options,
PB85-150357/GAR 514,437

TECTONICS
Archean Sedimentation and Tectonics in Southern Africa.
N85-13408/8/GAR 514,748

TELECOMMUNICATION
Mission Science Value-Cost Savings from the Advanced Imaging Communication System (AICS) (Advanced Imaging Communication System).
N85-12905/4/GAR 515,283

Systeme de Telecommunications Par Satellite Telecom 1 (The Telecom 1 Satellite Telecommunication System).
N85-13147/2/GAR 515,286

TELECOMMUNICATIONS
Impact of the AT and T (American Telephone and Telegraph) Divestiture on the Strategic Air Command.
AD-A148 957/4/GAR 515,281

TELEPHONE EXCHANGES
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PB85-855138/GAR 515,296

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PB85-854966/GAR 515,295

TELESCOPE COUNTERS
GSI-LBL Plastic Ball/Wall Spectrometer.
DE85001651/GAR 515,351

TELEVISION TRANSMISSION
Transmission de la Television en Modulation de Frequence (Television Transmission in Frequency Modulation).
N85-13146/4/GAR 515,285

TEMPERATURE EFFECTS
Bruit Robinet/Fluctuations de Pression. Etude du Comportement Acoustique des Equipments Hydrauliques du Batiment en Fonction de la Temperature (Tap Noise-Pressure Fluctuations. Study of the Acoustic Behavior of Hydraulic Equipment in Buildings as a Function of the Temperature).
N85-13201/7/GAR 515,179

TEMPERATURE MEASUREMENT
Development of a Feasibility Model for a Thin-Film Precision Power Meter.
N85-13217/3/GAR 515,226

TEMPERATURE MEASURING INSTRUMENTS
Fiber Optic, Fabry-Perot High Temperature Sensor.
N85-13594/5/GAR 515,232

TEMPERATURE SENSORS
Fiber Optic, Fabry-Perot High Temperature Sensor.
N85-13594/5/GAR 515,232

TENSILE PROPERTIES
Design and Use of Nonstandard Tensile Specimens for Irradiated Materials Testing.
DE85001071/GAR 514,987

Effect of Hydrostatic Pressure on the Tensile Properties of Alpha Uranium,
PB85-139640/GAR 515,000

TENSILE STRENGTH
Essai 17.208: Statistique sur les Caracteristics de Base des Composites Carbone-Epoxy (Traction) (Test Report No. 17.208: Statistics of the Basic Characteristics of Carbon-Epoxy Composites).
N85-12979/9/GAR 514,975

TERMINOLOGY
Aeronautical Radio Station Operators' Guide.
PB85-143741/GAR 514,330

TEST AND EVALUATION
US Army Test and Evaluation Command Test Operations Procedure 'Durability'.
AD-A149 003/6/GAR 515,198

TEST EQUIPMENT
Electromagnetic Inspection of Wire Ropes Using Sensor Arrays.
AD-A149 016/8/GAR 514,985

TEST FACILITIES
Safety Assessment for the RF Test Facility.
DE84017063/GAR 515,310

Space Power Distribution System Technology. Volume 3. Test Facility Design.
N85-12936/9/GAR 515,719

Neutron Spectral Characterization for the Fifth Heavy Section Steel Technology (HSST) Irradiation Series. Simulator Experiments.
NUREG/CR-4031/GAR 514,991

Acoustical Laboratory Accreditation Program of the United States.
PB85-151694 515,517

TETHERING
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N85-12921/1/GAR 515,706

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DE85002181/GAR 515,636

TEXT GENERATION
Cohesion in Computer Text Generation: Lexical Substitution.
AD-A148 990/5/GAR 514,811

TEXT PROCESSING
Cohesion in Computer Text Generation: Lexical Substitution.
AD-A148 990/5/GAR 514,811

TEXTS
Formats for Numerical and Textual Data in Data Processing.
N85-13504/4/GAR 514,826

TEXTURES
Ion Contrasting Chamber for Discrimination of Grains and Textures.
N85-13036/7/GAR 514,993

TFCX REACTORS
Toroidal Fusion Core Experiment (TFCX) Studies.
DE84016813/GAR 515,309

Tokamak Fusion Core Experiment: Design Studies Based on Superconducting and Hybrid Toroidal Field Coils. Design Overview.
DE85000448/GAR 515,313

Sputtering Performance of the TFCX Limiter.
DE85000779/GAR 515,316

TFTR REACTORS
First-Wall and Limiter Conditioning in TFTR.
DE85002714/GAR 515,336

THALLIUM
Dynamic Stark-Effect in Thallium,
PB85-143204/GAR 514,712

THALLIUM ATOMS
Dynamic Stark-Effect in Thallium,
PB85-143204/GAR 514,712

THERAPY
Postoperative Adjuvant Therapy of Breast Cancer.
PB84-922808/GAR 514,587

THERMAL CONDUCTIVITY
Thermal Conductivities for Sintered and Sphere-Pac Li sub 2 O and gamma exp - LiAlO sub 2 Solid Breeders with and Without Irradiation Effects.
DE85000775/GAR 515,315

THERMAL DEGRADATION
Liquid Phase Products and Solid Deposit Formation from Thermally Stressed Model Jet Fuels.
N85-13066/4/GAR 515,668

THERMAL DIFFUSION
Mound Activities in Chemical and Physical Research: January-June 1984.
DE85002552/GAR 515,340

THERMAL INSULATION
General Engineering Specifications for 6000 Tpd SRC-I Demonstration Plant.
DE85000032/GAR 515,610

THERMAL RADIATION
Measurement and Prediction of Thermal Injury in the Retina of the Rhesus Monkey.
AD-A148 977/2/GAR 514,654

THERMAL REACTORS
Blackness Coefficients, Effective Diffusion Parameters, and Control Rod Worths for Thermal Reactors.
DE85002646/GAR 515,487

THERMAL STRESSES
Liquid Phase Products and Solid Deposit Formation from Thermally Stressed Model Jet Fuels.
N85-13066/4/GAR 515,668

THERMITE
Program to Develop Thermite Reactions to Produce Refractory Borides and Carbides.
AD-A148 972/3/GAR 515,145

THERMOCLINES
On the Dynamics of the Coupled Mixed Layer-Thermocline System and the Determination of the Oceanic Surface Density.
AD-A148 968/1 514,737

THERMOCOUPLES
Development of a Feasibility Model for a Thin-Film Precision Power Meter.
N85-13217/3/GAR 515,226

THERMODYNAMIC CYCLES
Evaluation of Heat Engine for Hybrid Vehicle Application.
N85-13245/4/GAR 515,604

THERMODYNAMIC PROPERTIES
Application of Monte Carlo and Molecular Dynamics Methods to the Calculation of Thermodynamic Properties of Molten Salts.
AD-A148 897/2/GAR 515,491

Thermodynamic Properties of Ethylene at Saturation.
PB85-151777 514,722

THERMODYNAMICS
Experimentelle Zustandsgleichung fuer Bosonenga (Experimental Equations of State for Boson Gases).
N85-13659/6/GAR 515,588

Fundamentals of Alternate Cooling Systems.
PB85-151736 515,590

THERMOGRAVIMETRY
Development of Acceptance Criteria for Batches of Silane Primer for External Tank Thermal Protection System Bonding Applications.
N85-13043/3/GAR 514,681

Importance of Active Sites for Char Gasification in Oxygen (Air) and Carbon Dioxide.
PB85-155984/GAR 515,673

THERMOMETERS
Mound Activities in Chemical and Physical Research: January-June 1984.
DE85002552/GAR 515,340

THERMONUCLEAR REACTIONS
Low-Energy Nuclear Reactions with Hydrogen Isotopes.
DE85002388/GAR 515,564

Collective Effects in Spin Polarized Plasmas.
DE85002702/GAR 515,572

THERMONUCLEAR REACTOR MATERIALS
Office of Basic Energy Sciences Program to Meet High Priority Nuclear Data Needs of the Office of Fusion Energy: Summary of Results 1976-1983.
DE85001699/GAR 515,323

THERMONUCLEAR REACTORS
Cooperation and Competition on the Path to Fusion Energy.
DE85002392/GAR 515,330

THERMOPHYSICAL MODELS
Application of the Extended Corresponding States Model to Hydrocarbon Mixtures (Computer Program EXCST).
PB85-151744 514,721

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N85-13002/9/GAR 514,703

THERMOPLASTIC RESINS
Characterization of Novel Binders Based on Energetic Thermoplastic Elastomers.
AD-A148 993/9/GAR 515,017

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THERMOSPHERE
Thermospheric Energy Flux of the Semidiurnal Tide.
AD-A149 029/1/GAR 514,404

Global Matrix of Thermospheric Density Values for Selected Solar/Geomagnetic Conditions and Spacecraft Orbital Attitudes.
N85-13409/6/GAR 514,407

THICK FILMS
Qualification of a Thick Film Hybrid.
N85-13170/4/GAR 514,864

THIN FILMS
Development of a Feasibility Model for a Thin-Film Precision Power Meter.
N85-13217/3/GAR 515,226

THIONYL CHLORIDE
Acute Toxicity of Thionyl Chloride Vapor for Rats.
AD-A148 952/5/GAR 514,669

THIOPHENE
Studies of the Kinetics and Mechanisms of Ammonia Synthesis and Hydrodesulfurization on Metal Single Crystal Surfaces.
DE85001650/GAR 514,697

Hydrodesulfurization by Reduced Molybdenum Sulfides: Activity and Selectivity of Chevrel Phase Catalysts.
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THORIUM 230
Radioecological Investigations of Uranium Mill Tailings Systems. Fifth Technical Progress Report, October 1, 1983-September 30, 1984.
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THREE DIMENSIONAL FLOW
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AD-A148 971/5/GAR 515,528

Exploitation de Calculs Tridimensionnels dans les Compresseurs Transoniques (Development of Computations of Three Dimensional Flow through Transonic Compressors).
PB85-140903/GAR 515,540

THRUST AUGMENTATION
Viscous-Inviscid Aerodynamic Analysis of Two-Dimensional Thrust Augmentors.
N85-12861/9/GAR 514,317

Experimental Investigation of Two-Dimensional Thrust Augmenting Ejectors, Part 1.
N85-12894/0/GAR 515,684

THRUSTERS
Fundamental Studies on MPD(Magneto Plasma Dynamics) Thrusters.
AD-A149 074/7/GAR 515,600

THUNDERSTORMS
Investigations of Severe/Tornadic Thunderstorm Development and Evolution Based on Satellite and AVE/Sesame/VAS Data.
N85-13424/5/GAR 514,416

TIDES
Tidal Phase Control of Sediment Discharge from the Yangtze River.
AD-A148 876/6/GAR 514,735

TILT
Hemodynamics Responses to Upright Tilt at Sea Level and High Altitude,
AD-A148 848/5/GAR 514,661

TIME DIVISION MULTIPLE ACCESS
Systeme de Telecommunications Par Satellite Telecom 1 (The Telecom 1 Satellite Telecommunication System).
N85-13147/2/GAR 515,286

TIME-OF-FLIGHT SPECTROMETERS
Time-of-Flight Isochronous (TOFI) Spectrometer for Direct Mass Measurements of Exotic Light Nuclei.
DE85002050/GAR 515,352

TIME SERIES ANALYSIS
Methods of Computer-Aided Analysis of Non-Gaussian Noise and Application to Robust Adaptive Detection. Part 2.
AD-A148 879/0/GAR 514,856

Modelling and Residual Analysis of Nonlinear Auto-Regressive Time Series in Exponential Variables.
AD-A149 047/3/GAR 515,028

TIME SIGNALS
Object-Oriented Signal Processing Environment: The Knowledge-Based Signal Processing Package.
AD-A148 963/2/GAR 514,809

TIN
Waste Water Pollution Management and Control in the Petrochemical and Plastics Processing Industry,
PB85-145043/GAR 515,005

Recovery and Recycling of Tin in Tinplate Plant,
PB85-145084/GAR 515,007

TITAN
Outer Satellite Atmospheres: Their Nature and Planetary Interactions.
N85-13759/4/GAR 514,398

TITANIUM BORIDE
Evaluation of Titanium Diboride Gun Tube Coatings.
AD-A148 901/2/GAR 515,511

TITANIUM BORIDES
Evaluation of Titanium Diboride Gun Tube Coatings.
AD-A148 901/2/GAR 515,511

TITANIUM OXIDES
Organic Complexant-Enhanced Mobility of Toxic Elements in Low-Level Wastes.
DE85002375/GAR 515,410

TNT
Effects of Impurities and Additives on the Growth of Polycrystalline TNT,
AD-A149 085/3/GAR 514,691

TOKAMAK DEVICES
PPPL Tokamak Program.
DE85002703/GAR 515,334

Two-Chamber Model for Divertors with Plasma Recycling.
DE85002711/GAR 515,335

TOKAMAK TYPE REACTORS
Integrated-Blanket-Coil (IBC) Concept Applied to the Poloidal Field and Blanket Systems of a Tokamak Reactor.
DE85000437/GAR *515,312*

Remote Handling Requirements and Considerations for D-T Fusion Reactors.
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N85-13663/8/GAR *514,360*

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N85-13424/5/GAR *514,416*

TORQUE
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HRP-0906070/8/GAR *514,616*

Asbestos: Expedience, Exposure, and Human Experience,
HRP-0906074/0/GAR *514,617*

Hazards to Women in the Workplace,
HRP-0906079/9/GAR *514,618*

Guidance for the Reregistration of Manufacturing-Use and Certain End-Use Pesticide Products Containing Dialate.
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PB85-853302/GAR *514,621*

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AD-A148 868/3/GAR *514,667*

Acute Toxicity of Thionyl Chloride Vapor for Rats.
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PB85-144061/GAR *515,103*

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PB85-144103/GAR *514,672*

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PB85-144111/GAR *514,573*

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PB85-144129/GAR *514,574*

TOXICOLOGY
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PB85-142016/GAR *514,670*

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TRACTION
Animal Traction: Guidelines for Utilization.
PB85-146058/GAR *514,369*

TRADEMARKS
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TRAFFIC ENGINEERING
Guidelines for Left-Turn Treatments at Signal Controlled Intersections.
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TRAINING
Classroom Training Revision Methodology.
DE85002477/GAR *514,528*

TRAINING AMMUNITION
Variable Density Frangible Projectile.
PAT-APPL-6-666 785/GAR *515,501*

TRAINING PROGRAMS
Environmenal Sanitation Master Plan for Training and Education in Tanzania.
PB85-143022/GAR *515,101*

TRAINING SIMULATORS
Design, Fabrication and Delivery of a Spacelab Neutral Buoyancy Instrument Pointing System (IPS) Mockup.
N85-12934/4/GAR *514,532*

TRANSDUCERS
Surface-Wave Displacement: Absolute Measurements Using a Capacitive Transducer.
AD-A148 920/2/GAR *515,197*

Acoustic Emission Transducer Calibration by Means of the Seismic Surface Pulse.
AD-A148 921/0/GAR *515,513*

Piezoelectric Stress Transducer Used for Measurements of Explosions in Hard Rock.
DE85000300/GAR *515,509*

TRANSFER FUNCTIONS
Investigation of Several Aspects of LANDSAT 4/5 Data Quality.
N85-13357/7/GAR *514,829*

TRANSFORMERS
Medium Power Transformers, 115 KV and Below with and Without LTC.
DE85001377/GAR *514,788*

TRANSIENT OVERPOWER ACCIDENTS
Comparison of L04, L05, and L07: Three Irradiated 7-Pin Bundle TUCOP Tests.
DE84014680/GAR *515,471*

PFR/TREAT Program: Objectives, Accomplishments, and Plans.
DE84014751/GAR *515,472*

TRANSIENTS
Steady-State and Transient Fission Gas Release and Swelling Model for LIFE-4.
DE84014730/GAR *515,421*

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N85-13682/8/GAR *514,325*

TRANSMISSION ELECTRON MICROSCOPY
Electron Image Simulation: A Complementary Processing Technique.
DE85000685/GAR *515,520*

TRANSMISSIONS (MACHINE ELEMENTS)
Surveillance des Machines (The Monitoring of Machines).
N85-13253/8/GAR *515,167*

TRANSONIC FLOW
Grenzschichtuntersuchungen im Transonic-Kanal des Eidgenoessisches Flugzwerke, Emmen (Investigations of Boundary Layers in the Emmen Federal Aircraft Works Transonic Tunnel, Switzerland).
N85-12877/5/GAR *515,217*

Vergleichende Stroemungsrechnung an Transsonischen Kegel/Zylinder-Eichmodellen im Zusammenhang MIT Dem Wandinterferenzproblem (Comparative Flow Calculation on Transonic Cone/Cylinder Standard Models in Connection with the Wall Interference Problem).
N85-12878/3/GAR *515,218*

Local Slot Boundary Condition for Transonic Flow Calculations in Slotted-Wall Test Sections of Wind Tunnels.
N85-12879/1/GAR *515,219*

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TRANSPARENT PANELS
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PB85-144525/GAR *515,510*

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TRANSPORT PROPERTIES
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TRANSPORTATION
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PB84-916704/GAR *514,503*

TRANSPORTATION MANAGEMENT
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TRAPS
Evaluation of Cryogenic Trapping As a Means for Collecting Organic Compounds in Ambient Air,
PB85-144046/GAR *515,239*

TREATIES
Counterforce Deadlock: Are Arms Control Agreements Still Possible.
AD-A148 672/5/GAR *514,493*

TREES
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Ovipositional Stimulant for Trichogramma Spp.
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TRITIUM
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DE85002388/GAR *515,564*

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DE85002552/GAR *515,340*

TROMBE WALLS
Short Duration Winter-Time Performances of Different Passive Solar Systems.
DE85000850/GAR *515,067*

TROPICAL REGIONS
Tropical Timbers of the World,
PB85-156917/GAR *514,381*

TROPOSPHERE
Observational Study of Transport in the Free Troposphere,
PB85-144145/GAR *515,104*

TROUT
Effect of Pentachlorophenol on the Growth and Mortality of Embryonic and Juvenile Steelhead Trout.
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TRUCKS
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Air Abrasive Equipment for the Measurement of Residual Stresses in the Bores of Pipes and Tubes,
PB85-143170/GAR *515,180*

TUFF
Distribution of Radionuclides and Water in Bandelier Tuff Beneath a Former Los Alamos Liquid Waste Disposal Site after 33 Years.
DE85001406/GAR *515,402*

TUNGSTEN ALLOYS
Ultrasonic Inspection of Alloyed Tungsten Bars.
AD-A148 900/4/GAR *515,196*

TUNING DEVICES
Image Line Voltage Controlled Oscillator with Replaceable Components.
PAT-APPL-6-679 971/GAR *514,866*

Integrated Varactor Tuned Coaxial Gunn Oscillator for 60 GHz Operation.
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TURBINE BLADES
Observed Acoustic and Aeroelastic Spectral Responses of a MOD-2 Turbine Blade to Turbulence Excitation.
DE84013012/GAR *514,876*

Rotational Sound Development in Axial Turbomachinery and the Propagation in the Connected Tubing.
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TURBINES
Increase of Efficiency in Cooled High Temperature Turbines. Phase I.
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TURBOFAN ENGINES
Static Jet Noise Test Results of Four 0.35 Scale-Model QCGAT(Quiet Clean General Aviation Turbofan) Mixer Nozzles.
N85-13551/5/GAR *515,689*

TURBOMACHINERY
Rotational Sound Development in Axial Turbomachinery and the Propagation in the Connected Tubing.
DE84770493/GAR *514,888*

TURBULENCE
Role of Freestream Turbulence Scale in Subsonic Flow Separation.
N85-12870/0/GAR *514,322*

TURBULENT DIFFUSION
Kinetics of Nitric Oxide Formation in Laminar and Turbulent Methane Combustion.
PB85-149698/GAR *514,716*

TURBULENT FLOW
Study of the Structure of Turbulent Shear Flows at Supersonic Speeds and High Reynolds Number.
N85-12865/0/GAR *515,531*

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TWO DIMENSIONAL FLOW
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TWO PHASE FLOW
Combustion Waves in Dispersed-2-Phase Mixtures.
N85-13003/7/GAR *514,704*

TYPE 3 BURSTS
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Linear and Nonlinear Ultrasonic Interaction on Liquid-Solid Boundaries.
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Toward a Theory of Military Involvement in National Development in Underdeveloped Countries.
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An Oceanic Reverberation Model.
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Guidelines for Predicting the Effects of Underwater Explosions on Swimbladder Fish.
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VALVES
Isolation Valves of Steam Generators (Hopkinsons Valves) - Broken Bolts. Evaluation Report.
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VAPOR CONDENSATION
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VAPOR LIQUID EQUILIBRIUM
Semi-Automated Facilities for Measuring Density, PVT and VLE of Energy-Related Fluids.
PB85-151785 *514,723*

Universal Representation of the Thermodynamic Properties of Fluids in the Critical Region.
PB85-151793 *514,724*

VAPOR PRESSURE
Mathematical Models for the Boiling Diagram of the Ideal Two-Component Mixture.
N85-13000/3/GAR *514,701*

VARACTOR DIODES
Integrated Varactor Tuned Coaxial Gunn Oscillator for 60 GHz Operation.
PAT-APPL-6-679 974/GAR *514,868*

VARIABLE SPEED DRIVES
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VEGETABLE OILS
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PB85-855278/GAR *514,613*

VEGETATION
Scattering Models in the Microwave Regime.

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VELOCITY DISTRIBUTION
Etude Par Anemometrie Laser d'Ecoulements Decolles sur des Profils d'Ailes (Laser Anemometer Study of Separated Flow on Wing Profiles).
N85-12872/6/GAR 514,324

Etudes des Correlations Vitesse-Pression Acoustique Conditionnees sur le Signe et l'Amplitude de la Fluctuation de Vitesse dans UN Jet Froid (Study of the Velocity-Acoustic Pressure Correlation in a Cold Jet, Centered on the Sign and the Amplitude of the Velocity Fluctuations).
N85-13193/6/GAR 515,516

VELOCITY MODULATION
Velocity-Changing Collisional Effects in Nonlinear Atomic Spectroscopy and Photon Echo Decay in Gases.
N85-13559/8/GAR 514,707

VENEZUELA
Joint Venezuelan-German Feasibility Study: Integrated Production and Upgrading Including Energy Supply for Orinoco Heavy Oil, Pt. A.
DE84770500/GAR 515,606

VENTILATION
Ventilation Efficiency. Part 4. Displacement Ventilation in Small Rooms.
PB85-140879/GAR 515,073

Ventilation Efficiency. Part 6. A Survey of Concepts of Ventilation Effectiveness.
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VERY LARGE SCALE INTEGRATION
Ion Beam Lithography.
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VETERANS (MILITARY PERSONNEL)
Post-Traumatic Stress Disorder with Special Attention to Vietnam Veterans: Selected Bibliography (16th Revision).
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VIBRATION DAMPING
Turbine Blade Damping Study.
N85-12890/8/GAR 515,683

VIBRATION ISOLATORS
Vibration Isolated Cold Plate Assembly.
PAT-APPL-6-666 786/GAR 515,168

VIBRATION MEASUREMENT
Surveillance des Machines (The Monitoring of Machines).
N85-13253/8/GAR 515,167

VIDEO TAPES
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VIETNAM VETERANS
Post-Traumatic Stress Disorder with Special Attention to Vietnam Veterans: Selected Bibliography (16th Revision).
PB85-159341/GAR 514,598

VIETNAM WAR
Explaining the Bay of Pigs and Vietnam, 1965 Decisions.
AD-A149 030/9/GAR 515,271

VIRAL DISEASES
Etude des Hepatites Virales (Study of Viral Hepatitis).
PB85-142766/GAR 514,590

VIRUSES
Mechanisms of Bunyavirus Virulence: A Genetic Approach.
AD-A149 058/0/GAR 514,635

VISCOELASTICITY
Recent Developments and Open Problems in the Mathematical Theory of Viscoelasticity.
AD-A149 043/2/GAR 515,576

VISCOSITY
Development of Acceptance Criteria for Batches of Silane Primer for External Tank Thermal Protection System Bonding Applications.
N85-13043/3/GAR 514,681

Toughening Mechanism in Elastomer-Modified Epoxy Resins, Part 2.
N85-13046/6/GAR 515,018

VISCOUS FLOW
Viscous-Inviscid Aerodynamic Analysis of Two-Dimensional Thrust Augmentors.
N85-12861/9/GAR 514,317

VISIBLE SPECTRUM
Obturateur a Effet Kerr Optique. Rapport de Synthese Finale (Obturator with Optic Kerr Effect. Final Report).
PB85-137289/GAR 514,711

VISION
Statistical Analysis of Helicopter Pilot Performance during Instrument Flight Across Repeated Flights.
AD-A148 903/8/GAR 514,514

VISUAL OBSERVATION
Procedures for Precap Visual Inspection.
N85-13156/3/GAR 515,149

VISUAL PERCEPTION
Multiple Resources and Brain Laterality.
AD-A148 912/9/GAR 514,645

Selecting One Among the Many: A Simple Network Implementing Shifts in Selective Visual Attention.
AD-A148 989/7/GAR 514,545

VITAL STATISTICS
Tendencias Recentes na Metodologia de Levantamentos Demograficos em Paises em Desenvolvimento (Recent Methodological Trends in Demographic Investigation in Developing Countries).
PB85-140119/GAR 514,551

VITRIFICATION
In Situ Vitrification Pilot-Scale Radioactive Test.
DE85002671/GAR 515,416

VOICE COMMUNICATION
Aeronautical Radio Station Operators' Guide.
PB85-143741/GAR 514,330

VOLATILE ORGANIC COMPOUNDS
Evaluation of Cryogenic Trapping As a Means for Collecting Organic Compounds in Ambient Air.
PB85-144046/GAR 515,239

VOLTAGE CONTROLLED OSCILLATORS
Image Line Voltage Controlled Oscillator with Replaceable Components.
PAT-APPL-6-679 971/GAR 514,666

VOLUMETRIC PUMPS
Health Equipment Information Number 125, September 1984 (Evaluation Issue).
PB85-135580/GAR 514,624

VORTEX SHEETS
Physics on Aircraft Wakes.
N85-12871/8/GAR 514,323

VORTICES
Partikelmitfuehrung in Einem Kompressiblen Wirbel (Particle Entrainment in a Compressible Vortex).
N85-13192/8/GAR 515,532

VOYAGER PROJECT
Mission Science Value-Cost Savings from the Advanced Imaging Communication System (AICS) (Advanced Imaging Communication System).
N85-12905/4/GAR 515,283

VULNERABILITY
Methodology for the Determination of Rotary Wing Aircraft Vulnerabilities in Air-to-Air Combat Simulation.
AD-A148 984/8/GAR 514,328

WAFERS
Ion Beam Lithography.
N85-13219/9/GAR 515,151

WALKING
Baerandet av Last i Militaerhistoriskt och Fysiologiskt Perspektiv - En Litteraturstudie (Military History and Physiology of Load Carriage - A Survey of Literature).
PB85-145894/GAR 514,666

WALL FLOW
Wandeinfluss-Korrekturen in Windkanaelen: Blockierungskorrektur Nach der Wandrucksignatur-Methode (Wall Influence Corrections in Wind Tunnels: Blockage Correction According to the Wall Pressure Signature Method).
N85-12875/9/GAR 515,215

Parametrische Bestimmung der Blockierungsinterferenzen fuer Drei-Dimensionale Modelle im Transonic-Kanal des Eidgenoessisches Flugzwerk, Emmen (Parametric Determination of Blockage Interference of 3-Dimensional Models in the Emmen Federal Aircraft Works Transonic Tunnel (Switzerland)).
N85-12876/7/GAR 515,216

Local Slot Boundary Condition for Transonic Flow Calculations in Slotted-Wall Test Sections of Wind Tunnels.
N85-12879/1/GAR 515,219

Untersuchung Zur Verbesserung der Transonic-Kanal-Messstrecke des Eidgenoessisches Flugzwerke, Emmen (Investigation for the Improvement of the Transonic Tunnel Working Section of the Emmen Federal Aircraft Works (Switzerland)).
N85-12904/7/GAR 515,221

Progress in the Development of a Two-Fluid Model of Turbulence for Near-Wall Flows, Part 1.
N85-13196/9/GAR 515,535

Progress in the Development of a Two-Fluid Model of Turbulence for Near-Wall Flows. Part 3: Preliminary Investigation of a Stably-Stratified Boundary Layer.
N85-13197/7/GAR 515,536

Proposal for Wall Function for Friction and Heat Transfer in the Presence of Roughness and Mass Transfer.
N85-13198/5/GAR 515,537

WALL PRESSURE
Singularitaeten-Modell Zur Analyse der Wandinterferenz in Geschlossenen Windkanalen Nach der Wanddrucksignatur-Methode (Blockierung und Auftrieb) (Singularity Model for the Analysis of Wall Interference in Closed Wind Tunnels According to the Wall Pressure Signature Method (Blockage and Lift)).
N85-12874/2/GAR 515,214

Vergleichende Stroemungsrechnung an Transsonischen Kegel/Zylinder-Eichmodellen im Zusammenhang MIT Dem Wandinterferenzproblem (Comparative Flow Calculation on Transonic Cone/Cylinder Standard Models in Connection with the Wall Interference Problem).
N85-12878/3/GAR 515,218

WALLS
Response Measurements for Two Building Structures Excited by Noise from a Large Horizontal Axis Wind Turbine Generator.
N85-13552/3/GAR 515,191

WARNING SYSTEMS
Review of British Flood Forecasting Practice.
PB85-140515/GAR 514,754

WASTE DISPOSAL
Solid Waste Management Options for Naval Installations on Guam.
AD-A148 947/5/GAR 515,081

Hill AFB, Utah Installation Restoration Program. Phase IIB, IRP Survey. Volume 1. Text. Volume 2. Appendices.
AD-A149 013/5/GAR 514,742

WASTE ENERGY UTILIZATION
Overview of Waste Heat Utilization Systems.
N85-13692/7/GAR 514,922

WASTE MANAGEMENT
Solid Waste Management Options for Naval Installations on Guam.
AD-A148 947/5/GAR 515,081

ORNL (Oak Ridge National Laboratory) Resource Conservation and Recovery Training Program.
DE85000167/GAR 514,526

WASTE PROCESSING PLANTS
Combustion of Industrial Waste Gases, Residual and Waste Liquids and Fluids.
DE84770478/GAR 514,988

WASTE RECYCLING
Waste Water Pollution Management and Control in the Petrochemical and Plastics Processing Industry.
PB85-145043/GAR 515,005

Recovery and Recycling of Tin in Tinplate Plant.
PB85-145084/GAR 515,007

WASTE UTILIZATION
Waste Water Pollution Management and Control in the Petrochemical and Plastics Processing Industry.
PB85-145043/GAR 515,005

WASTE WATER
Steam Stripping of Oil Shale Wastewaters. LBL/SEEHRL Steam Stripper: Design, Operation, and Maintenance Manual.
DE85003058/GAR 515,089

WATER
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WATER ANALYSIS
Simple Assessment Techniques for Soil and Water.
PB85-142669/GAR 514,781

WATER DISTRIBUTION
'Klebsiella' Occurrence, Significance and Detection in Water Systems: A Progress Report.
PB85-144160/GAR 514,636

WATER GAS PROCESSES
Studies Related to the Homogeneous Catalysis of the Water Gas Shift Reaction. Technical Progress Report, December 1, 1983-November 30, 1984.
DE85000811/GAR 515,622

WATER HEATING
Qualificazione di Sistemi Non-Invasivi Per la Rivelazione on-Line di Perdite in Preriscaldatori d'Acqua Alimento AD Alta Pressione (Qualification of Noninvasive Systems for on-Line Leak Detection in High Pressure Feed Water Preheaters).
N85-13555/6/GAR 515,230

WATER HYACINTH
Biogasification of Walt Disney World Biomass Waste Blend.
PB85-156958/GAR 515,674

WATER PIPES
Freezing and Blocking of Water Pipes.
AD-A148 943/4/GAR 515,175

WATER POLLUTION
Field Experiment Determinations of Distribution Coefficients of Actinide Elements in Sulfate Lake Environments.
NUREG/CR-4094/GAR 515,341

Environmenal Sanitation Master Plan for Training and Education in Tanzania.
PB85-143022/GAR 515,101

Biological Methods for Determining Toxicity of Contaminated Freshwater Sediments to Invertebrates.
PB85-144103/GAR 514,672

Heterotrophic Bacteria in Potable Water: Progress in Method Options and Monitoring Benefits.
PB85-144152/GAR 515,105

Eulerian-Lagrangian Analysis of Pollutant Transport in Shallow Water.
PB85-144269/GAR 515,107

WATER POLLUTION CONTROL
Liquid-Liquid Extraction of Trace Level Pesticides from Process Streams.

PB85-152650/GAR 515,113

WATER POLLUTION EFFECTS (ANIMALS)
Effects of Cadmium on the Population Growth of a Benthic Invertebrate Aeolosoma Headleyi (Oligochaeta).
PB85-144079 514,671

WATER QUALITY MANAGEMENT
Water Quality Modelling, Forecasting and Control,
PB85-139434/GAR 515,095

WATER SUPPLY
Bivalve Fouling of Nuclear Power Plant Service-Water Systems. Volume 1. Correlation of Bivalve Biological Characteristics and Raw-Water System Design,
NUREG/CR-4070-V1/GAR 514,732

Public Groundwater Supplies in Will County,
PB85-138550/GAR 514,753

Environmenal Sanitation Master Plan for Training and Education in Tanzania.
PB85-143022/GAR 515,101

'Klebsiella' Occurrence, Significance and Detection in Water Systems: A Progress Report,
PB85-144160/GAR 514,636

Water and Human Health,
PB85-144723/GAR 515,110

WATER TREATMENT
Building 1 Cooling Tower Ozone Project.
AD-A148 902/0/GAR 515,058

Drinking Water Microbiology. NATO/CCMS (Committee on the Challenges of Modern Society) Drinking Water Pilot Project Series,
PB85-144343/GAR 515,109

WATER VAPOR
Experimental and Theoretical Study of Condensation in Multicomponent Vapors. Quarterly Report No. 1 for 15 February-14 May 1984.
DE85000857/GAR 514,696

WATERED-OUT GAS RESERVOIRS
Co-Production of Gas and Water, Third Year.
PB85-156974/GAR 514,769

WATERFLOODING
Multi-Pattern Low-Tension Demonstration Flood, Big Muddy Field. Technical Progress Report, July-September 1984.
DE85002157/GAR 514,761

WATERFORD-3 REACTOR
Technical Specifications for Waterford Steam Electric Station, Unit No. 3, Docket No. 50-382, Appendix A to License No. NPF-26,
NUREG-0973/GAR 515,462

WATERSHEDS
NASA/ASEE Summer Faculty Fellowship Program, 1984.
N85-13663/8/GAR 514,380

Analysis of Watershed Management (El Salvador, Guatemala, Honduras),
PB85-141745/GAR 515,099

WATTMETERS
Development of a Feasibility Model for a Thin-Film Precision Power Meter.
N85-13217/3/GAR 515,226

Wideband Sampling Wattmeter.
PB85-144855 515,242

WAVE FUNCTIONS
Oscillator Strengths for OII Ions.
N85-13558/0/GAR 514,706

WAVE PROPAGATION
Digital Radio Link: Wave Propagation Measurements Using Narrow Band Technique.
N85-13152/2/GAR 515,291

WAVEFORMS
Ambiguity Function of Random Binary-Phase-Coded Waveforms,
AD-A148 906/1/GAR 514,857

WAVEGUIDE LASERS
Investigation of RF Excited CW CO2 Waveguide Lasers.
N85-13221/5/GAR 515,546

WAVEGUIDES
Implementing Waveguide Bandwidth Six-Port Reflectometer Circuits at Millimetric Wavelengths.
N85-13155/5/GAR 515,222

WEAPONS
Theory of Lethality.
DE85000457/GAR 515,265

WEAR
Effect of Humidity on Fretting Wear of Several Pure Metals.
N85-13006/0/GAR 514,992

Rotating Tool Wear Monitoring Apparatus.
PATENT-4 471 444 515,169

WEAR RESISTANCE
Evaluation of Titanium Diboride Gun Tube Coatings.
AD-A148 901/2/GAR 515,511

WEAR TESTS
Surveillance des Machines (The Monitoring of Machines).
N85-13253/8/GAR 515,167

WEATHER FORECASTING
Monthly and Seasonal Weather Outlook for January 1985, Volume 39, Number 1, December 29, 1984.
PB85-148799/GAR 514,420

WEATHER STATIONS
Inzameling en Opslag van Cabauwmetingen: Een Systeemvoorstel (Acquisition and Storage of Cabauw Measurements: A System Proposal).
N85-13434/4/GAR 514,417

WEIGHT INDICATORS
Specifications, Tolerances, and Other Technical Requirements for Weighing and Measuring Devices as Adopted by the 69th National Conference on Weights and Measures, 1984 (1985 Edition).
PB85-157550/GAR 515,251

WEIGHT REDUCTION
Les Materiaux Structuraux Modernes Situation Actuelles et Perspectives d'Evolution (Modern Structural Materials. Present Situation and Evolution Prospects).
N85-12886/6/GAR 514,335

WEIGHTING FUNCTIONS
Long-Range Predictive Control Using Weighting-Sequence Models.
N85-13521/8/GAR 515,039

WELD METAL
Shape of the Fusion Boundary in an Electromagnetically Stirred Weld Pool,
PB85-138774/GAR 515,154

WEST GERMANY
Colloquium About Joint Projects within DFVLR/ISRO(Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt/Indian Space Research Organization, Bangalore, Satellite Centre) Cooperation.
N85-12907/0/GAR 515,703

WESTERN REGION (UNITED STATES)
Regional Investment Strategies: Information and Analytical Tools.
PB85-144335/GAR 514,482

WHEAT
Reference Tables and Graphs for World Wheat Trade.
PB85-145027/GAR 514,959

WHEEL CHAIRS
Market for Wheelchairs: Innovations and Federal Policy.
PB85-145944/GAR 514,630

WIND DIRECTION
Multisensor Satellite Data Integration for Sea Surface Wind Speed and Direction Determination.
N85-13446/8/GAR 514,770

WIND TUNNEL MODELS
Singularitaeten-Modell Zur Analyse der Wandinterferenz in Geschlossenen Windkanalen Nach der Wanddrucksignatur-Methode (Blockierung und Auftrieb) (Singularity Model for the Analysis of Wall Interference in Closed Wind Tunnels According to the Wall Pressure Signature Method (Blockage and Lift)).
N85-12874/2/GAR 515,214

Vergleichende Stroemungsrechnung an Transsonischen Kegel/Zylinder-Eidhmodellen im Zusammenhang MIT Dem Wandinterferenzproblem (Comparative Flow Calculation on Transonic Cone/Cylinder Standard Models in Connection with the Wall Interference Problem).
N85-12878/3/GAR 515,218

WIND TUNNEL TESTS
Etude Par Anemometrie Laser d'Ecoulements Decolles sur des Profils d'Aile (Laser Anemometer Study of Separated Flow on Wing Profiles).
N85-12872/6/GAR 514,324

Adaptation de Parois a Mach 1.2 (Wall Adaptation at Mach 1.2).
N85-12873/4/GAR 515,213

Singularitaeten-Modell Zur Analyse der Wandinterferenz in Geschlossenen Windkanalen Nach der Wanddrucksignatur-Methode (Blockierung und Auftrieb) (Singularity Model for the Analysis of Wall Interference in Closed Wind Tunnels According to the Wall Pressure Signature Method (Blockage and Lift)).
N85-12874/2/GAR 515,214

Wandeinfluss-Korrekturen in Windkanaelen: Blockierungskorrektur Nach der Wandrucksignatur-Methode (Wall Influence Corrections in Wind Tunnels: Blockage Correction According to the Wall Pressure Signature Method).
N85-12875/9/GAR 515,215

Parametrische Bestimmung der Blockierungsinterferenzen fuer Drei-Dimensionale Modelle im Transonic-Kanal des Eidgenoessisches Flugzwerk, Emmen (Parametric Determination of Blockage Interference of 3-Dimensional Models in the Emmen Federal Aircraft Works Transonic Tunnel (Switzerland)).
N85-12876/7/GAR 515,216

Grenzschichtuntersuchungen im Transonic-Kanal des Eidgenoessisches Flugzwerke, Emmen (Investigations of Boundary Layers in the Emmen Federal Aircraft Works Transonic Tunnel, Switzerland).
N85-12877/5/GAR 515,217

Vergleichende Stroemungsrechnung an Transsonischen Kegel/Zylinder-Eidhmodellen im Zusammenhang MIT Dem Wandinterferenzproblem (Comparative Flow Calculation on Transonic Cone/Cylinder Standard Models in Connection with the Wall Interference Problem).
N85-12878/3/GAR 515,218

Flight and Wind-Tunnel Comparisons of the Inlet-Airframe Interaction of the F-15 Airplane.
N85-12884/1/GAR 514,334

Evaluation of the Langley 4- by 7-Meter Tunnel for Propeller Noise Measurements.
N85-13553/1/GAR 515,229

Premiers Essais Cryogeniques du Profil Cast 7 a la Soufflerie T2. Comparaisons Avec les Calculs (First Cryogenic Test of the Cast 7 Profile in the T2 Wind Tunnel. Comparison with Calculations).
N85-13682/8/GAR 514,325

WIND TUNNEL WALLS
Adaptation de Parois a Mach 1.2 (Wall Adaptation at Mach 1.2).
N85-12873/4/GAR 515,213

Singularitaeten-Modell Zur Analyse der Wandinterferenz in Geschlossenen Windkanalen Nach der Wanddrucksignatur-Methode (Blockierung und Auftrieb) (Singularity Model for the Analysis of Wall Interference in Closed Wind Tunnels According to the Wall Pressure Signature Method (Blockage and Lift)).
N85-12874/2/GAR 515,214

Wandeinfluss-Korrekturen in Windkanaelen: Blockierungskorrektur Nach der Wandrucksignatur-Methode (Wall Influence Corrections in Wind Tunnels: Blockage Correction According to the Wall Pressure Signature Method).
N85-12875/9/GAR 515,215

Parametrische Bestimmung der Blockierungsinterferenzen fuer Drei-Dimensionale Modelle im Transonic-Kanal des Eidgenoessisches Flugzwerk, Emmen (Parametric Determination of Blockage Interference of 3-Dimensional Models in the Emmen Federal Aircraft Works Transonic Tunnel (Switzerland)).
N85-12876/7/GAR 515,216

Local Slot Boundary Condition for Transonic Flow Calculations in Slotted-Wall Test Sections of Wind Tunnels.
N85-12879/1/GAR 515,219

WIND TUNNELS
Grenzschichtuntersuchungen im Transonic-Kanal des Eidgenoessisches Flugzwerke, Emmen (Investigations of Boundary Layers in the Emmen Federal Aircraft Works Transonic Tunnel, Switzerland).
N85-12877/5/GAR 515,217

Evaluation of the Langley 4- by 7-Meter Tunnel for Propeller Noise Measurements.
N85-13553/1/GAR 515,229

WIND TURBINES
Test Field Pellworm for Wind Turbines.
DE84752110/GAR 514,882

Response Measurements for Two Building Structures Excited by Noise from a Large Horizontal Axis Wind Turbine Generator.
N85-13552/3/GAR 515,191

WIND VELOCITY
Multisensor Satellite Data Integration for Sea Surface Wind Speed and Direction Determination.
N85-13446/8/GAR 514,770

WINDING
Development of a Prototype Flat Winding Machine for Winding Air Deployed Fiberoptic Cable.
AD-A149 038/2/GAR 515,164

WINDOWS
Measurement of Fenestration Net Energy Performance: Considerations Leading to Development of the Mobile Window Thermal Test (MoWiTT) Facility.
DE85000711/GAR 515,120

WINDOWS (APERTURES)
Response Measurements for Two Building Structures Excited by Noise from a Large Horizontal Axis Wind Turbine Generator.
N85-13552/3/GAR 515,191

WING OSCILLATIONS
Graphische Software Zur Darstellung der Deformationsbewegung Eines Koerpers (Graphics Software for the Display of Body Deformation Motion).
N85-12888/2/GAR 514,336

WING PROFILES
Etude Par Anemometrie Laser d'Ecoulements Decolles sur des Profils d'Aile (Laser Anemometer Study of Separated Flow on Wing Profiles).
N85-12872/6/GAR 514,324

WING TIP JETS
Aerodynamic Improvements by Discrete Wing Tip Jets.
AD-A148 981/4/GAR 514,314

WING TIPS
Aerodynamic Improvements by Discrete Wing Tip Jets.
AD-A148 981/4/GAR 514,314

WINGLETS
Natural Laminar Flow Airfoil Design Considerations for Winglets on Low-Speed Airplanes.
N85-12863/5/GAR 514,319

Flutter Parametric Studies of Cantilevered Twin-Engine-Transport Type Wing with and Without Winglet. Volume 1: Low-Speed Investigations.
N85-13269/4/GAR 514,339

Flutter Parametric Studies of Cantilevered Twin-Engine Transport Type Wing with and Without Winglet. Volume 2: Transonic and Density Effect Investigations.
N85-13270/2/GAR 514,340

WINGS
Improving the Fatigue Life of the Mirage IIIO Wing Main Spar.
AD-A149 054/9/GAR 514,333

KEYWORD INDEX

WIPP
Waste Accountability, Shipping, and Packaging (WASP) Handbook.
DE85001535/GAR *515,381*

WIRE ROPE
Electromagnetic Inspection of Wire Ropes Using Sensor Arrays.
AD-A149 016/8/GAR *514,985*

WNP-1 REACTOR
BPA (Bonneville Power Administration) Review of Washington Public Power Supply System, Projects 1 and 3 (WNP 1 and 3): Construction Schedule and Financing Assumptions. Draft Study Report, Part 1.
DE85001176/GAR *515,439*

WNP-3 REACTOR
BPA (Bonneville Power Administration) Review of Washington Public Power Supply System, Projects 1 and 3 (WNP 1 and 3): Construction Schedule and Financing Assumptions. Draft Study Report, Part 1.
DE85001176/GAR *515,439*

WOOD
Assessment of Biomass Harvesting on Small Woodlots in New Hampshire.
DE85000681/GAR *514,378*

Modified Extruder for Feeding Fine-Ground Cellulosic Slurries to Pressure Systems. Final Report, 1978-1980.
DE85001688/GAR *515,630*

Direct Combustion Systems to Produce Power from Biomass from Wood, Forest and Agricultural Crop Residue,
PB85-137800/GAR *515,670*

Tropical Timbers of the World,
PB85-156917/GAR *514,381*

WOOD PARTICLE BOARDS
Structural Use of Chipboard for Flooring: State of the Art Report.
PB85-139855/GAR *515,122*

WORD PROCESSING
Bulletin of the Faculty of Engineering, Hokkaido University, No. 123.
N85-13075/5/GAR *514,446*

WRITING
E. C. Meyer, General, United States Army, Chief of Staff, June 1979-June 1983.
AD-A149 006/9/GAR *514,520*

X RADIATION
Materials Science with Synchrotron Radiation: The Case for a Superprobe.
DE85001893/GAR *515,204*

X RAY ANALYSIS
X Ray Fluorescence Analysis. July 1960-February 1985 (Citations from the NTIS Data Base).
PB85-854768/GAR *514,727*

X-RAY DETECTION
Linear, Position-Sensitive X-Ray Detector Used for Real-Time Calculations of Small-Angle Scattering Parameters with Submillisecond Resolution.
DE85002530/GAR *515,207*

X RAY FLUORESCENCE
X Ray Fluorescence Analysis. July 1960-February 1985 (Citations from the NTIS Data Base).
PB85-854768/GAR *514,727*

X RAY TELESCOPES
Normal Incidence, High Resolution X-Ray Telescope for Solar Coronal Observations.
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N85-12589/0/GAR *514,941*

ERIKSSON, K.
Time Discretization of Parabolic Problems by the Discontinuous Galerkin Method.
N85-13543/2/GAR *515,046*

ERUP, L.
Transmission Analysis for the Use of 2-4 PSK (Phase Shift Keying) Modulation in Satellite Broadcasting.
N85-13151/4/GAR *515,290*

ESCANDE, B.
Calcul d'Ecoulements Internes a Grand Nombre de Reynolds par Resolution Numerique des Equations de Navier-Stokes (Computation of Internal Flows at High Reynolds Number by Numerical Solution of the Navier-Stokes Equations).
PB85-140895/GAR *515,539*

ESSIG, S. S.
Evaluation of an Advanced Combat Vehicle Identification (CVI) Training Program (Masking): A New Approach to Target Acquisition Training.
AD-A148 911/1/GAR *514,516*

ETCHEPARE, J.
Obturateur a Effet Kerr Optique. Rapport de Synthese Finale (Obturator with Optic Kerr Effect. Final Report).
PB85-137289/GAR *514,711*

EUBANK, B. F.
Operations FLINTLOCK and LATCHKEY Events RED HOT, PIN STRIPE, DISCUS THROWER, PILE DRIVER, DOUBLE PLAY, NEWPOINT, MIDI MIST, 5 March 1966-26 June 1967.
AD-A148 997/0/GAR *515,342*

EVANS, R. P.
LOFT (Loss-of-Fluid Test) Experimental Measurements Uncertainty Analysis. Volume 22. Fission Product Detection System Instruments Recorded on the DAVDS (Data Acquisition and Visual Display System).
NUREG/CR-0169-V22/GAR *515,450*

EZZELL, J. W.
Anthrax Toxin.
AD-A148 936/8/GAR *514,668*

FAGERBURG, T. L.
Fixed-Cone Valve Prototype Tests, New Melones Dam, California.
AD-A148 939/2/GAR *515,174*

FAHRENSCHON, K.
Investigation and Development of Multicolored Liquid Crystal Display Systems for Automotive Dashboard Application and Large Format Information Boards.
N85-13652/1/GAR *515,128*

FAINBERG, J.
Interplanetary Radio Storms. 2: Emission Levels and Solar Wind Speed in the Range 0.05-0.8 AU.
N85-13761/0/GAR *514,400*

FALCONER, J. L.
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DE85000424/GAR *515,619*

FALETTI, D. W.
User's Guide for the BNW-III Optimization Code for Modular Dry/Wet-Cooled Power Plants.
DE85001456/GAR *514,935*

FAMIGLIETTI, M.
Qualificazione di Sistemi Non-Invasivi Per la Rivelazione on-Line di Perdite in Preriscaldatori d'Acqua Alimento AD Alta Pressione (Qualification of Noninvasive Systems for on-Line Leak Detection in High Pressure Feed Water Preheaters).
N85-13555/6/GAR *515,230*

FANNIN, K. F.
Anaerobic Digestion of Biomass: Status Summary and Research and Development Needs, 1983 (Condensed Version).
PB85-159457/GAR *515,676*

Biological Gasification of Renewable Resources.
PB85-156966/GAR *515,675*

FANTON, J. W.
Squamous Cell Carcinoma with Metastasis in a Rhesus Monkey (Macaca mulatta).
AD-A148 869/1/GAR *514,578*

FARBER, B. F.
Space Power Distribution System Technology. Volume 3. Test Facility Design.
N85-12936/9/GAR *515,719*

FARLEY, K. J.
Ponding of Effluents from Fossil Fuel Steam Electric Power Plants.
PB85-144244/GAR *515,106*

FARRINGTON, G. C.
Polymeric Electrolytes for Ambient Temperature Lithium Batteries. Final Report.
DE85001032/GAR *514,955*

FAVRE, J. P.
Interaction Fatigue - Fluage dans les Composites Carbone/Resine + or - 45 degrees (Interaction Fatigue - Creep in Carbon/Resin Compounds + or - 45 degrees).
PB85-141588/GAR *514,982*

FEARING, R. S.
Simplified Grasping and Manipulation with Dextrous Robot Hands.
AD-A148 962/4/GAR *515,163*

FEDERICI, C.
Essais de Susceptibilite a Une Agression Electromagnetique (Tests for Susceptibility to Electromagnetic Attack).
N85-13154/8/GAR *515,345*

FEHLAU, P. E.
Application of Wald's Sequential Probability Ratio Test to Nuclear Materials Control.
DE85002017/GAR *515,479*

FEITKNECHT, W.
Alpha-Form of the Hydroxides of Bivalent Metals.
N85-13009/4/GAR *514,705*

FELCH, K. L.
60 GHz Gyrotron Development Program. Quarterly Report No. 19, January-March 1984.
DE85000599/GAR *515,314*

FELDERMAN, E. J.
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DE85000854/GAR *514,934*

FELDMAN, E. E.
Unprotected Loss-of-Heat Sink Simulation in the EBR-II Plant.
DE84009630/GAR *515,428*

FELDMAN, G. J.
4 pi Detectors.
DE85002605/GAR *515,359*

FELDMESSER, J.
Soil Sampling Apparatus.
PAT-APPL-6-637 241/GAR *514,780*

FERAUDI, M.
Prevalencia de Bocio Endemico en la Poblacion escolar de Bolivia (Prevalence of Endemic Goiter in the School Population of Bolivia),
PB85-137925/GAR *514,505*

FERGUSON, J. M.
Finite Element Method for Solving Neutron Transport Problems.
DE85001075/GAR *515,379*

FERGUSON, R. L.
Large Acceptance Spectrometers for pi exp 0 Mesons.
DE85002472/GAR *515,357*

FERNANDEZ, S. J.
Determination of Iodine Specific Activity in Nuclear Fuel Reprocessing Plant off-Gases.
DE85000193/GAR *515,475*

FERRALL, J. F.
Direct Coal Combustion Data Handbook.
DE85001028/GAR *515,624*

FFOLLIOTT, P. F.
Manejo de Cuencas y Monitoreo Ambiental (Watershed Resources Management and Environmental Monitoring),
PB85-141711/GAR *515,098*

FIDLER, R.
Air Abrasive Equipment for the Measurement of Residual Stresses in the Bores of Pipes and Tubes,
PB85-143170/GAR *515,180*

FIDLER, R. S.
Sodium Chemistry in the MEL In-Sodium Creep Facilities,
PB85-143139/GAR *515,237*

FIETZ, W. A.
Startup of Large Coil Test Facility.
DE85001669/GAR *514,789*

FIFE, K. W.
Recent Development in Pyrochemistry at Los Alamos.
DE85000174/GAR *515,388*

FINDLAY, R. H.
An Experimental Investigation of Enhanced Harpacticoid (Copepoda) Abundances Around Isolated Seagrass Shoots.
AD-A148 918/6/GAR *514,731*

FINEGOLD, J. G.
Dissociated Methanol Citation. Final Report.
DE85000505/GAR *515,620*

FINKEN, R.
PRIAMUS: Ein Rechenprogramm zur Bestimmung Thermophysikalischer Stoffwerte von Gasmischungen Aus O2, N2, CO, CO7, He, H2O, H2 und CH4 (PRIAMUS, a Computer Program for the Calculation of Thermophysical Properties of Gas Mixtures Containing O2, N2, CO, CO2, He, H2O, H2, CH4).
N85-13002/9/GAR *514,703*

FISCHER, E. A.
Fuel Disruption Mechanisms Determined In-Pile in the ACRR (Annular Core Research Reactor).
NUREG/CR-3780/GAR *515,482*

FISCHER, N. D.
Frequency Dependence of Effective Nasal Resistance.
PB85-144095 *514,591*

FISCHER, R. D.
Assessment of Ground-Coil Heat-Pump Technology.
DE85002567/GAR *515,071*

FISHER, J. E.
BURYIT/ANALYZ: A Computer Package for Assessment of Radiological Risk of Low-Level Radioactive Waste Land Disposal. Usar's Manual,
NUREG/CR-3994/GAR *515,425*

FISHER, R. S.
Chloride Movement Across Basolateral Membrane of Necturus Epithelium.
AD-A148 929/3/GAR *514,648*

FITZGERALD, M. L.
Language Independent Superstructure for Implementing Real-Time Control Systems.
PB85-151801 *514,840*

FITZPATRICK, G. J.
Streamer Initiation in Liquid Hydrocarbons under Divergent Field Conditions.
PB85-151611 *515,527*

FJELDAAS, S.
Basis for a Geometric Modeller,
PB85-140861/GAR *514,837*

FLANAGAN, C. A.
Tokamak Fusion Core Experiment: Design Studies Based on Superconducting and Hybrid Toroidal Field Coils. Design Overview.
DE85000448/GAR *515,313*

FLANIGAN, V. J.
Geological and Geophysical Evidence of Structures in Northwest-Trending Washes, Yucca Mountain, Southern Nevada, and Their Possible Significance to a Nuclear Waste Repository in the Unsaturated Zone.
DE85002656/GAR *515,415*

FLETCHER, E. A.
Simple Model for Predicting the Flux Distribution through the Focal Plane of a Multifaceted-Concentrator Solar Furnace.
AD-A149 063/0/GAR *515,059*

FLIGG,
Sector Suite Man/Machine Functional Capabilities and Performance Requirements.
AD-A148 881/6/GAR *514,803*

FOERST, R.
International Comparative Study of Systems for the Government Advancement of Research and Development.
N85-13689/3/GAR *514,500*

FOLDS, D. J.
Statistical Analysis of Helicopter Pilot Performance during Instrument Flight Across Repeated Flights.
AD-A148 903/8/GAR *514,514*

FOLEY, W. J.
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NUREG/CR-3791/GAR *514,790*

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NUREG/CR-3794/GAR *515,454*

FOLKERS, G. D. G.
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FONG, W. S.
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FONTANGES, R.
Etude des Hepatites Virales (Study of Viral Hepatitis).
PB85-142768/GAR *514,590*

FORBUS, K. D.
Qualitative Process Theory.
AD-A148 987/1/GAR *514,810*

FORD, P. C.
Studies Related to the Homogeneous Catalysis of the Water Gas Shift Reaction. Technical Progress Report, December 1, 1983-November 30, 1984.
DE85000811/GAR *515,622*

FORD, R. R.
Some Addition and Complexation Reactions of a Silylated Amino(Methylene)Phosphine.
AD-A149 042/4/GAR *514,683*

Synthesis of Some Highly Silylated Aminophosphines and Their Reactions with Carbon Tetrachloride.
AD-A149 066/3/GAR *514,684*

FORSTER, E. O.
Streamer Initiation in Liquid Hydrocarbons under Divergent Field Conditions.
PB85-151611 *515,527*

FOUSEK, R. J.
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DE85000781/GAR *514,933*

FOUTY, S. C.
Index to Published Geologic Maps in the Region around the Potential Yucca Mountain Nuclear Waste Repository Site, Southern Nye County, Nevada.
DE85000260/GAR *515,389*

FOX, L. J.
60 GHz Gyrotron Development Program. Quarterly Report No. 19, January-March 1984.
DE85000599/GAR *515,314*

FRANCESCONI, R. P.
Food Deprivation and Exercise in the Heat: Thermoregulatory and Metabolic Effects,
AD-A148 847/7/GAR *514,660*

FRANKS, L. A.
Applications of Pulsed-Laser Techniques and Thermographic Phosphors to Dynamic Thermometry of Rotating Surfaces.
DE85000403/GAR *515,202*

FRASER, C. M.
Derivative Expansions of Fermion Determinants: Anomaly-Induced Vertices, Goldstone-Wilczek Currents, and Skyrme Terms,
PB85-139756/GAR *515,566*

FRAZIER, B.
Manual for Building Temporary Emergency Shelters (Manual para la Construccion de Abrigos de Emergencia Temporales) (Manuel pour la Construction des Abris D'Urgence Temporaires) (Kitab li bina Ma'Wa Muwagat fil Halat at Tawara),
PB85-143808/GAR *515,123*

FREEMAN, H. D.
Engineered Sorbent Barriers for Low-Level Waste.
DE85000833/GAR *515,397*

FRELIN, A. J.
Army Nurse Corps Personnel Management Practices (Executive Summary).
AD-A148 890/7/GAR *514,579*

FRENKEL, A.
Search for the Radiative Decay of a Cosmic Relic Particle with IUE.
N85-13707/3/GAR *514,394*

FREY, R. B.
Some Aspects of the Micromechanics of Hot Spot Formation in Energetic Materials,
AD-P004 348/9/GAR *515,495*

FRICK, J.
Rotationsinelastic Streuung von He-Atoms an HF-, HCl-, CF4-, SF6-, C2H6- und C2F6-Molekuelen (Rotational Inelastic Scattering of He-Atoms at HF-, HCl-, CF4-, SF6-, C2H6- and C2F6-Molecules).
N85-13590/3/GAR *514,710*

FRIEDLANDER, A.
Yaughan and Curriboo Plantations: Studies in Afro-American Archaeology.
AD-A148 985/5/GAR *514,508*

FRIEDMAN, M.
Effect of Ventilation and Perfusion Imbalance on Inert Gas Rebreathing Variables.
PB85-144087 *514,650*

FRIES, S.
Test Field Pellworm for Wind Turbines.
DE84752110/GAR *514,882*

FRILEY, J. R.
Comparison of Structural Computer Programs Used for the Analysis of Spent Fuel Shipping Casks.
DE85002444/GAR *515,385*

Pipe-to-Pipe Impact Program.
DE84013162/GAR *515,429*

FRISH, M. B.
Experimental and Theoretical Study of Condensation in Multicomponent Vapors. Quarterly Report No. 1 for 15 February-14 May 1984.
DE85000857/GAR *514,696*

FRUCHTER, J. S.
Radionuclide Migration in Groundwater - Annual Report for FY 1983.
NUREG/CR-3712/GAR *515,423*

FRY, D. N.
Report of the First United States Conference on Utility Experience with Neutron Noise Analysis.
DE85002459/GAR *515,447*

FUJII, R. U.
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PB85-151769 *514,839*

FUJITA, T.
Review of Solar Fuel-Producing Quantum Conversion Processes.
DE85000336/GAR *515,617*

Solar Photochemical Process Engineering for Production of Fuels and Chemicals.
DE85000335/GAR *515,616*

FULCO, C. S.
Hemodynamics Responses to Upright Tilt at Sea Level and High Altitude,
AD-A148 848/5/GAR *514,661*

FULLTON, J. M.
Frequency Dependence of Effective Nasal Resistance.
PB85-144095 *514,591*

FUNG, A. K.
Scattering Models in the Microwave Regime.
N85-13361/9/GAR *515,591*

FURTH, H. P.
PPPL Tokamak Program.
DE85002703/GAR *515,334*

FURUKAWA, T. P.
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AD-A149 034/1/GAR *514,663*

GABRIEL, T. A.
Compensation Effects in Hadron Calorimeters.
DE85002594/GAR *515,358*

KEYWORD INDEX

GADZUK, J. W.
Vibrational Excitation, Harpooning, and Sticking in Molecule-Surface Collisions.
PB85-151603 *514,719*

GAKSTATTER, J. H.
Biological Methods for Determining Toxicity of Contaminated Freshwater Sediments to Invertebrates.
PB85-144103/GAR *514,672*

GALEY, W. R.
Effect of Inert Gases on Ion Transport Across the Erythrocyte Membrane.
AD-A148 869/9/GAR *514,644*

GALLAGHER, J. S.
Thermodynamic Properties of Isobutane-Isopentane Mixtures from 240 to 600K and up to 20 MPa (with Supplemental Tables from -40 to + 600F and up to 1000 psia).
PB85-154581/GAR *514,725*

GALLUSCIO, E. H.
Multiple Resources and Brain Laterality.
AD-A148 912/9/GAR *514,645*

GARCIA, L.
Analysis of Watershed Management (El Salvador, Guatemala, Honduras).
PB85-141745/GAR *515,099*

Calculation of Stellarator Equilibria in Vacuum Flux Surface Coordinates.
DE85001693/GAR *515,322*

GARMLAND, S.
Pulse Injection on a Power Cable Penetrating a Shielding Wall by Feed-Through Capacitors.
N85-13171/2/GAR *514,793*

GAROW, J.
Regenerative Fuel Cell Energy Storage System for a Low Earth Orbit Space Station.
N85-13371/8/GAR *514,945*

GARROW, P. H.
Yaughan and Curriboo Plantations: Studies in Afro-American Archaeology.
AD-A148 985/5/GAR *514,508*

GASSER, R. D.
MARCON - Development and Applications to Containment Loading Calculations.
DE85002442/GAR *515,384*

GATTO, F. B.
Infrared-Thermal Wave Scanner for NDE of Naval Thermal Spray Coatings.
DE85002237/GAR *515,205*

GAWRON, V. J.
Effects of Side Impact Padding on Driver Performance.
PB85-136372/GAR *515,129*

GAYOU, D. E.
High Resolution Computed Tomography for Solid Modeling and Computer Aided Design.
DE85000085/GAR *515,147*

GEARHEART, R. A.
Environmenal Sanitation Master Plan for Training and Education in Tanzania.
PB85-143022/GAR *515,101*

GEE, G. W.
Predicting Long-Term Moisture Contents of Earthen Covers at Uranium Mill Tailings Sites.
DE85000777/GAR *515,392*

Transport Assessment - Arid: Measurement and Prediction of Water Movement Below the Root Zone.
DE85000834/GAR *515,398*

GELDREICH, E. E.
Heterotrophic Bacteria in Potable Water: Progress in Method Options and Monitoring Benefits,
PB85-144152/GAR *515,105*

'Klebsiella' Occurrence, Significance and Detection in Water Systems: A Progress Report,
PB85-144160/GAR *514,636*

GELLMAN, A. J.
Studies of the Kinetics and Mechanisms of Ammonia Synthesis and Hydrodesulfurization on Metal Single Crystal Surfaces.
DE85001650/GAR *514,697*

GENTRY, G. L.
Evaluation of the Langley 4- by 7-Meter Tunnel for Propeller Noise Measurements.
N85-13653/1/GAR *515,229*

GERMANE, G. J.
Fundamental Combustion Studies of Low-Rank Coal Slurries. Monthly Progress Report, 1 October 1984-31 October 1984.
DE85002496/GAR *515,658*

GERMER, W.
Development of Components for Micro-C Oriented Sensor Systems.
N85-13215/7/GAR *515,224*

GERONE, P. J.
Biomechanical Studies of Impact Acceleration Research.
AD-A149 077/0/GAR *514,665*

GHIA, S.
Qualificazione di Sistemi Non-Invasivi Per la Rivelazione on-Line di Perdite in Preriscaldatori d'Acqua Alimento AD Alta Pressione (Qualification of Noninvasive Systems for on-Line Leak Detection in High Pressure Feed Water Preheaters).
N85-13555/6/GAR *515,230*

GHILADI, A.
Rotational Sound Development in Axial Turbomachinery and the Propagation in the Connected Tubing.
DE84770493/GAR *514,888*

GIBBONS, J. H.
Energy Management: Theory and Practice. Final Report.
DE85000646/GAR *514,901*

GIDDINGS, J. C.
Field-Flow Fractionation in the Analysis of Energy Related Materials. Progress Report, February 1, 1984-January 31, 1985.
DE85000869/GAR *514,676*

GIGUERE, P.
Los Alamos Nuclear Plant Analyzer: An Interactive Power-Plant Simulation Program.
DE85002412/GAR *515,445*

GILBERT, E. S.
Krypton-85 Health Risk Assessment for a Nuclear Fuel Reprocessing Plant.
DE85000838/GAR *514,615*

GILBERT, P. A.
Investigation of Density Variation in Triaxial Test Specimens of Cohesionless Soil Subjected to Cyclic and Monotonic Loading.
AD-A148 944/2/GAR *514,778*

GILCHRIESE, M. G. D.
4 pi Detectors.
DE85002605/GAR *515,359*

GILLI, M.
Les Systemes de Lancements (Launching Systems).
N85-12917/9/GAR *515,721*

GIRVIN, D. C.
Radionuclide Migration in Groundwater - Annual Report for FY 1983.
NUREG/CR-3712/GAR *515,423*

GIRVIN, S. M.
Electron-Phonon Interactions and the Breakdown of the Dissipationless Quantum Hall Effect.
PB85-151595 *515,586*

GIVIDEN, G. M.
Fire Support Team Vehicle (FIST-V) System: An Analysis of Human Factors, Training, Safety and Related Considerations.
AD-A149 070/5/GAR *515,504*

GLACKIN, D. L.
Multisensor Satellite Data Integration for Sea Surface Wind Speed and Direction Determination.
N85-13446/8/GAR *514,770*

GLENN, H. D.
Subsidence in the Craters of Nuclear Tests at the Pacific Proving Grounds.
DE85000747/GAR *515,344*

GLICKSMAN, L. R.
Internal Seal for Repairing Natural Gas Mains.
PB85-142685/GAR *514,957*

GLINSKY, G. P.
Dissociated Methanol Citation. Final Report.
DE85000505/GAR *515,620*

GLISSMEYER, J. A.
Prototype Firing Range Air Cleaning System.
DE85000360/GAR *515,176*

GLOVER, C. V.
USAWC (United States Army War College) Military Studies Program. Logistical Support for Chemical Special Ammunition in a Theater of Operations.
AD-A148 861/8/GAR *515,258*

GLYNN, P. W.
Regenerative Structure of Markov Chains Simulated via Common Random Numbers.
AD-A149 092/9/GAR *515,033*

GOE, M. R.
Animal Traction: Guidelines for Utilization.
PB85-146058/GAR *514,369*

GOKHALE, R. B.
Role of Freestream Turbulence Scale in Subsonic Flow Separation.
N85-12870/0/GAR *514,322*

GOLD, R.
Interactive and Automated Systems for Nuclear Track Measurements with Applications to Fast Neutron Dosimetry.
DE85002240/GAR *515,353*

Standardized Physics-Dosimetry for US Pressure Vessel Cavity Surveillance Programs.
DE85002236/GAR *515,444*

GOLDMAN, A. J.
Strategic Analysis for Safeguards Systems: A Feasibility Study. Vol. 1. Main Report.
NUREG/CR-3926-V1/GAR *515,483*

Strategic Analysis for Safeguards Systems: A Feasibility Study. Vol. 2. Appendix.
NUREG/CR-3926-V2/GAR *515,484*

GOLISH, L. M.
Graphics Translators for Computer-Aided Drafting and Design: Interface Alternatives for the A/E Community.
AD-A148 892/3/GAR *514,805*

GOLOMB, D. S.
Ambient Monitoring of Pollutants Around Synfuel Plants.
PB85-142701/GAR *515,100*

GOLUB, L.
Normal Incidence, High Resolution X-Ray Telescope for Solar Coronal Observations.
N85-13699/2/GAR *514,387*

GONG, H.
Chinese Journal of Infrared Research (Selected Articles)--Translation.
AD-A149 059/8/GAR *515,199*

GONZALEZ, R. C.
Long-Term Automated Surveillance of a Commercial Nuclear Power Plant.
DE85002469/GAR *515,449*

GOOD, S. E.
Computer Center CDC Libraries.
AD-A149 005/1/GAR *514,812*

GOODMAN, M.
Compensation Effects in Hadron Calorimeters.
DE85002594/GAR *515,358*

GOODWIN, G. M.
Effect of Temperature on the Stress-Relaxation Response of a Pressure Vessel Steel.
NUREG/CR-3728/GAR *514,989*

GOODWIN, V. D.
Development of a Prototype Flat Winding Machine for Winding Air Deployed Fiberoptic Cable.
AD-A149 038/2/GAR *515,164*

GORIS, P.
Universal Fast Breeder Reactor Subassembly Counter Manual.
DE85001523/GAR *515,349*

GOTO, H.
Effect of Humidity on Fretting Wear of Several Pure Metals.
N85-13006/0/GAR *514,992*

GOULD, R. B.
Air Force Civilian Potential Appraisal System: Development.
AD-A148 909/5/GAR *514,515*

GOVER, A.
Axial Velocity Spread Acceptance of Free Electron Lasers.
AD-A149 024/2/GAR *515,544*

GRAEBER, G. M.
An Analysis of Creatine Phosphokinase in the Mucosa and the Muscularis of the Gastrointestinal Tract.
AD-A148 991/3/GAR *514,564*

GRAF, J. M.
Guide to Radiological Accident Considerations for Siting and Design of DOE Nonreactor Nuclear Facilities.
DE85002435/GAR *515,446*

GRAHAM, D. L.
Assessment of Drilling Fluid Tracers Used to Monitor Borehole Development for Hydrochemical Sampling.
DE85001222/GAR *515,400*

GRAHAM, W. R.
Atomic Structure and Optical Constants of (001) Tantalum.
PB85-151629 *515,525*

GRANGER, R. B.
Centralized Control versus Command Flexibility at the Installation.
AD-A148 852/7/GAR *514,421*

GRANTHAM, D. H.
High-Temperature Optically Activated GaAs Power Switching for Aircraft Digital Electronic Control.
N85-12901/3/GAR *514,337*

GRANVILLE, R. A.
Cohesion in Computer Text Generation: Lexical Substitution.
AD-A148 990/5/GAR *514,811*

GRAY, L. H.
Nuclear Power Plant Control Room Operators' Performance Research.
DE85002326/GAR *515,362*

GRAY, M. R.
Asbestos: Expedience, Exposure, and Human Experience,
HRP-0906074/0/GAR *514,617*

GREEN, B. D.
Demonstration of a Capsule Plasmid in Bacillus anthracis,
AD-A148 935/0/GAR *514,633*

GREEN, C.
Knowledge based Programming Applications,
AD-A148 913/7/GAR *514,806*

GREEN, D. R.
Infrared-Thermal Wave Scanner for NDE of Naval Thermal Spray Coatings.
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HOMA, M. I.
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HONADLE, G.
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HORD, J.
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HORN, D. A.
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HORN, R. E.
Coaxial Cavity Gunn Oscillator Using Probe Coupled Microstrip.
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HUBBARD, G. B.
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HUBBARD, H. H.
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HUBBARD, J. B.
Electrostriction and Dielectric Friction on Ions Moving through Compressible Polar Solvents.
PB85-151702 *514,720*

HUBBARD, R. W.
Food Deprivation and Exercise in the Heat: Thermoregulatory and Metabolic Effects,
AD-A148 847/7/GAR *514,660*

HUBBELL, R. L.
Dissent, Objectivity and Ethics in Program Evaluation,
PB85-144608/GAR *514,436*

HUDLICKA, E.
Design of a Knowledge-Based Fault Detection and Diagnosis System,
AD-A148 859/2/GAR *514,422*

Meta-Level Control through Fault Detection and Diagnosis,
AD-A149 064/8/GAR *514,815*

HUFFER, F.
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HULL, J. R.
Mathematical Modeling and Evaluation of Radionuclide Transport Parameters from the ANL Laboratory Analog Program.
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HULLANDER, E. L.
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PB85-143097/GAR *514,481*

HUNOLD, K.
Development and Fabrication of Refractory Bodies for Gas Turbine Engines.
N85-12899/9/GAR *515,686*

KEYWORD INDEX

HUNT, R. W.
Evaluation of Small Enterprise Programs and Projects: Issues in Business and Community Development.
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Selected Geologic Literature Lower Mississippi Valley Division Area Index and Annotated Bibliography. Supplement 6.
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HUNTZINGER, C. J.
Neutron and gamma-Ray Dose Measurements at Various Distances from the Little Boy Replica.
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HURLEY, C. F.
Produced Fluid Emulsions. Final Report.
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HURLEY, J. P.
Building 1 Cooling Tower Ozone Project.
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HUSTAD, J. E.
Experimental Study of Turbulent Jet Diffusion Flames (Revised Version).
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HUSTON, W.
Research Priorities for Improving the Effectiveness of Active Solar Hot Water and Space Conditioning Systems.
PB85-153443/GAR *515,076*

HUTCHINSON, R. A.
Capabilities of Laser Diagnostics for Combustion and Flowfields.
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HYMAN, J.
Ion Thruster System (8-cm) Cyclic Endurance Test.
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IVINS, B. E.
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JACOBSEN, R. T.
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JACQUES, R. G.
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JAEGER, W.
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JAHANGIRI, M.
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JAMES, E.
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JAMES, K.
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JANARDAN, B. A.
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JIA, R. Q.
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JIA, S. B.
Laminar Jet Issuing into Stagnant Surroundings.
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JIN, K. K.
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JOHNSON, B. A.
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JOHNSON, D. L.
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JOHNSON, J. T.
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JOHNSON, K. I.
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JOHNSON, L. L.
Scientific and Technical Information Transfer: Issues and Options.
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JOHNSON, N. J.
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JOHNSON, P. N.
USAWC (United States Army War College) Military Studies Program. Soviet Merchant Marine.
AD-A148 860/0/GAR *515,172*

JOHNSON, P. S.
Pilot Program for an Automated Data Collection System.
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JOHNSON, R. H.
Strapdown Navigation Algorithms Implemented in the Inertial and Geographic Frames.
AD-A148 908/7/GAR *515,301*

JOHNSON, T. R.
Three-Dimensional Analysis of Heat Transfer and Gas Flow in a Radiant Furnace.
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JONES, C. M.
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JONES, E.
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JONES, G. R.
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DE85000964/GAR *515,318*

JONES, R. F.
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DE85002786/GAR *514,913*

JORGENSEN, C. C.
Development of Methods for Nuclear Power Plant Personnel Qualifications and Training.
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JORY, H. R.
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JOY, M.
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N85-13701/6/GAR *514,389*

JOYNER, W. R.
Soil Sampling Apparatus.
PAT-APPL-6-637 241/GAR *514,780*

JU, F. D.
Antiplane Cracks in Solid Propellants,
AD-P004 344/8/GAR *515,699*

JUHASZ, A. A.
Effects of Perforation L/D Ratio and Slotting on Stick Propellant Combustion.
AD-A148 854/3/GAR *515,490*

JUNDE, L.
Piezoelectric Stress Transducer Used for Measurements of Explosions in Hard Rock.
DE85000300/GAR *515,509*

JURACH, P. J.
Long Span Bridge Deflections.
PB85-136883/GAR *515,192*

JURAS, R. C.
Status Report on the ORNL (Oak Ridge National Laboratory) 25 URC Accelerator.
DE85002498/GAR *515,554*

JZY, W.
Organ-Pipe Oscillation.
N85-13199/3/GAR *515,178*

KALIBJIAH, R.
Approaches to Ultrafast Neutron Detectors.
DE85001206/GAR *515,347*

KALIMULLAH,
Analytical Formula for Fuel Particle to Liquid Sodium Heat Transfer.
DE84014734/GAR *515,432*

KALKOFEN, W.
Time Dependent Effects at the Foot of the Chromosphere.
N85-13762/8/GAR *514,401*

KALLFELZ, J. M.
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DE85000928/GAR *515,485*

KAM, F. B. K.
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DE85001188/GAR *515,488*

KANG, H.
Versatile CAMAC Power Supply Controller-Monitor with Built-in Ramping and Ripple Monitor.
DE85002686/GAR *515,210*

KANNBERG, L. D.
Underground Pumped Hydroelectric Storage.
DE85000288/GAR *514,953*

KAPFER, C.
Expression of Lipopolysaccharide 0 Antigen in Escherichia coli K-12 Hybrids Containing Plasmid and Chromosomal Genes from Shigella dysenteriae 1.
AD-A148 942/6/GAR *514,580*

KARCH, N. J.
Review and Evaluation of the Evidence for Cancer Associated with Air Pollution.
PB85-142016/GAR *514,670*

KARLSSON, T.
Pulse Injection on a Power Cable Penetrating a Shielding Wall by Feed-Through Capacitors.
N85-13171/2/GAR *514,793*

KARON, S. L.
Market for Wheelchairs: Innovations and Federal Policy.
PB85-145944/GAR *514,630*

KATZ, T. J.
Metal-Catalyzed Rearrangement of Alkene-Alkynes and the Stereochemistry of Metallacyclobutene Ring Opening.
AD-A149 084/6/GAR *514,690*

KAUFFMAN, H. E.
Mejoramiento de Arroz (Rice Improvement),
PB85-143113/GAR *514,376*

KAWAMOTO, M.
Color-Liquid-Crystal Display for Automotive Instrument Panel.
PB85-149557/GAR *515,142*

KAYSER, R. F.
Asymptotic Density Correlations and Corrections to Scaling for Fluids with Non-Finite-Range Interactions.
PB85-151645 *515,542*

KAZIMI, M. S.
Loop Simulation Capability for Sodium-Cooled Systems.
PB85-144236/GAR *515,469*

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PB85-144251/GAR *515,470*

Titan Code Development for Application to a PWR Steam Line Break Accident, 1983-84.
PB85-142693/GAR *515,466*

KEEFE, R. L.
Summary of the Mechanism of Delayed Detonation,
AD-P004 347/1/GAR *515,508*

KEETON, L. W.
Analysis of Physical-Chemical Processes Governing SSME Internal Fluid Flows.
N85-12859/3/GAR *515,696*

KEGOZZI, C.
Bruit Robinet/Fluctuations de Pression. Etude du Comportement Acoustique des Equipments Hydrauliques du Batiment en Fonction de la Temperature (Tap Noise-Pressure Fluctuations. Study of the Acoustic Behavior of Hydraulic Equipment in Buildings as a Function of the Temperature).
N85-13201/7/GAR *515,179*

KELLEY, E. F.
Streamer Initiation in Liquid Hydrocarbons under Divergent Field Conditions.
PB85-151611 *515,527*

KELLEY, N. D.
Observed Acoustic and Aeroelastic Spectral Responses of a MOD-2 Turbine Blade to Turbulence Excitation.
DE84013012/GAR *514,876*

KELLOGG, L. S.
Standardized Physics-Dosimetry for US Pressure Vessel Cavity Surveillance Programs.
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KELMERS, A. D.
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KENNA, B. T.
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KENNISH, W. J.
Research Priorities for Improving the Effectiveness of Active Solar Hot Water and Space Conditioning Systems.
PB85-153443/GAR *515,076*

KEOUGH, F. P.
Explaining the Bay of Pigs and Vietnam, 1965 Decisions.
AD-A149 030/9/GAR *515,271*

KERR, G. D.
Sulfur Activation in Electric Pole Insulators in Hiroshima.
DE85001169/GAR *515,266*

KEY, T. S.
Utility-Interactive Photovoltaic Power Conditioning Technology in the United States.
DE85002634/GAR *514,941*

KHATIB-RAHBAR, M.
Two-Dimensional Modeling of Intra-Subassembly Heat Transfer and Buoyancy-Induced Flow Redistribution in LMFBRs (Liquid Metal Fast Breeder Reactors).
NUREG/CR-3498/GAR *515,451*

KIDD, W. S. F.
Archean Sedimentation and Tectonics in Southern Africa.
N85-13408/8/GAR *514,748*

KIM, W. S.
Liquid Phase Products and Solid Deposit Formation from Thermally Stressed Model Jet Fuels.
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N85-13010/2/GAR *514,860*

KINCAID, J. F.
Report on AGARD Meeting Hazards Studies for Solid Propellant Rocket Motors,
AD-P004 340/6/GAR *515,695*

KINDLE, C. H.
Leak Detectors for Organic Rankine Cycle Power Plants: On-Line and Manual Methods.
DE85002792/GAR *514,943*

KING, J. M.
Proceedings: Third User's Workshop on Combat Stress; Cohesion Held at Fort Sam Houston, Texas on 21-23 September 1983.
AD-A149 035/8/GAR *514,664*

KING, P. A.
Strategy, Policy and Contingency Planning. The US Defense Planning Process.
AD-A148 851/9/GAR *515,260*

KING, R. B.
Tests of the Application of the Radioactive Microsphere Technique to the Measurement of Regional Myocardial Blood Flow,
PB85-142727/GAR *514,649*

KING, S.
Energy-Related Risk in the United States in the Year 2020.
DE84017213/GAR *514,881*

KING, W. H.
Data Base Development for Ship Readiness Analyses.
AD-A149 036/6/GAR *514,814*

KING, W. T.
Technique for Reduction of Coherence Function Bias Error.
DE85002593/GAR *515,208*

KINKEAD, E. R.
Acute Toxicity of Thionyl Chloride Vapor for Rats.
AD-A148 952/5/GAR *514,669*

KINOSHITA, G. S.
Accelerated Aging of Aluminized Acrylic Solar Mirror Materials.
DE85002683/GAR *514,911*

KINOSHITA, M.
Color-Liquid-Crystal Display for Automotive Instrument Panel,
PB85-149557/GAR *515,142*

KIRBY, L. J.
In Situ gamma-Ray Spectrometric Analysis of Radionuclide Distributions at a Commercial Shallow Land Burial Site.
DE85002376/GAR *515,411*

KIREJCZYK, H. J.
Cold Weather 83 Evaluation of the Mobile Food Service Unit and Tray Packs.
AD-A148 850/1/GAR *514,604*

Field Feeding System to Support USMC Forces in the 1990s.
AD-A148 953/3/GAR *514,606*

KIRKBY, J.
4 pi Detectors.
DE85002605/GAR *515,359*

KIRKHAM, R. R.
Transport Assessment - Arid: Measurement and Prediction of Water Movement Below the Root Zone.
DE85000834/GAR *515,398*

KIRKPATRICK, D. C.
RCSLK9: Reactor Coolant System Leak Rate Determination for PWRs (Pressurized Water Reactors). User's Guide.
NUREG-1107/GAR *515,465*

KEYWORD INDEX

KIRSTEINS, I.
Methods of Computer-Aided Analysis of Non-Gaussian Noise and Application to Robust Adaptive Detection. Part 2.
AD-A148 879/0/GAR *514,856*
Probability Density of Signal-to-Noise Ratio in an Improved Adaptive Detector. Part 1.
AD-A148 856/8/GAR *514,855*

KLARMANN, J.
Scintillator-Fiber Charged Particle Track-Imaging Detector.
N85-13560/6/GAR *515,360*

KLEMS, J. H.
Measurement of Fenestration Net Energy Performance: Considerations Leading to Development of the Mobile Window Thermal Test (MoWITT) Facility.
DE85000711/GAR *515,120*

KLETNICK, R.
Determining the Need for Training: A Collection of Federal Agency Needs Assessment Practices,
PB85-144806/GAR *514,538*

KLICKMAN, A. E.
Comparison of L04, L05, and L07: Three Irradiated 7-Pin Bundle TUCOP Tests.
DE84014680/GAR *515,471*

KMETYK, L. N.
RELAP5 Assessment: Conclusions and User Guidelines.
NUREG/CR-3936/GAR *515,457*

KNAPP, R. H.
High Resolution Computed Tomography for Solid Modeling and Computer Aided Design.
DE85000085/GAR *515,147*

KNEE, H. E.
Maintenance Personnel Performance Simulation (MAPPS) Model.
DE85002324/GAR *515,361*

KNEUBUEHL, B.
Optimization of Boattails for Small Arms Bullets,
PB85-143758/GAR *515,503*

KNICKLE, H. N.
Study of Multiphase Flow Useful to Understand Scaleup of Coal Liquefaction Reactors. 1981-1984 Final Report.
DE85001312/GAR *515,627*

KNOP, E. C.
Population Growth and Development in Egypt: Farmers' and Rural Development Officials' Perspectives,
PB85-141661/GAR *514,350*

KNOP, S. A.
Population Growth and Development in Egypt: Farmers' and Rural Development Officials' Perspectives,
PB85-141661/GAR *514,350*

KNOTT, P. R.
Experimental Investigation of Shock-Cell Noise Reduction for Single Stream Nozzles in Simulated Flight.
N85-13550/7/GAR *515,688*

KOBUS, D. A.
Relative Effectiveness of Red and White Light for Subsequent Dark-Adaptation.
AD-A148 883/2/GAR *514,662*

KOCH, A.
Development and Testing of Thin Film Cells for High Temperature Water Vapor Electrolysis.
N85-13001/1/GAR *514,702*

KOCH, C.
Selecting One Among the Many: A Simple Network Implementing Shifts in Selective Visual Attention.
AD-A148 989/7/GAR *514,545*

KOETZ, J.
Evaluation of Cryogenic Trapping As a Means for Collecting Organic Compounds in Ambient Air,
PB85-144046/GAR *515,239*

KOLB, B.
GSI-LBL Plastic Ball/Wall Spectrometer.
DE85001651/GAR *515,351*

KOLODZIEJCZYK, P.
Evaluation of the Birdstrike Threat to the F-15 Present Fleet, Rapid Deployment Force, and Dual Role Fighter Transparencies.
AD-A148 954/1/GAR *514,331*

KONTAGORA, M. T.
Africa: A Strategic Factor in the Strategic Equation of the World.
AD-A148 983/0/GAR *514,496*

KORTEN, A.
Evaluation of Birth Histories: A Case Study of Kenya.
PB85-141844/GAR *514,555*

KOSSEL, D.
Ion Contrasting Chamber for Discrimination of Grains and Textures.
N85-13036/7/GAR *514,993*

KOZLU, H.
Study of Deposition Control Using Transpiration. Technical Progress Report, September 1984.
DE85000215/GAR *515,682*

KRAKOWSKI, R. A.
Compact Reversed-Field Pinch Reactors (CRFPR): Preliminary Engineering Considerations.
DE85002351/GAR *515,329*

KRAMER, G.
Degraded Piping Program. Phase 2. Semiannual Report, March 1984-September 1984.
NUREG/CR-4082-V1/GAR *515,459*

KRAMER, J.
Distributed Data Processing Design Methodology.
AD-A148 888/1/GAR *514,804*

KRANZ, H.
Ion Beam Lithography.
N85-13219/9/GAR *515,151*

KRAUTHAMER, S.
Utility-Interactive Photovoltaic Power Conditioning Technology in the United States.
DE85002634/GAR *514,941*

KRAUZE, L. D.
Evaluation of Automated Decisionmaking Methodologies and Development of an Integrated Robotic System Simulation.
N85-13516/8/GAR *514,828*

KRAWCHUK, R. B.
First-Wall and Limiter Conditioning in TFTR.
DE85002714/GAR *515,336*

KRESOVICH, S.
Ethanol from Sugar Crops: A Critical Review,
PB85-140176/GAR *515,671*

KRIENEN, F.
Proposal for Hollow Cathode Electron Gun for Electron Cooling.
DE85002721/GAR *515,559*

KRIER, H.
Transition to Detonation from Rapid-Compression (Ramp-Waves) Generated in a Burning Porous Bed,
AD-P004 345/5/GAR *515,700*

KRISHNA, C. M.
Unified Method for Evaluating Real-Time Computer Controllers: A Case Study.
N85-13478/1/GAR *514,342*

KRISHNAN, R. P.
Assessment of Slurry Pump Technology for Direct Coal Liquefaction Demonstration and Pioneer Commercial Plants.
DE85000163/GAR *515,612*

KRISTIANSEN, P.
Transmission Analysis for the Use of 2-4 PSK (Phase Shift Keying) Modulation in Satellite Broadcasting.
N85-13151/4/GAR *515,290*

KRON, N. F.
Energy Supply and Use in United States Localities: The Institutional and Legal Setting.
DE85002249/GAR *514,908*

KRONHAMN, T.
Multi Target Tracking by Dynamic Scene Analysis,
AD-A148 922/8/GAR *515,307*

KROTHAPALLI, A.
Study of Flow Past an Airfoil with a Jet Issuing from Its Lower Surface.
N85-12860/1/GAR *514,316*

KUBO, M. M.
Spillway Deflectors at Bonneville, John Day and McNary Dams on Columbia River, Oregon-Washington and Ice Harbor, Lower Monumental and Little Goose Dams on Snake River, Washington. Hydraulic Model Investigation.
AD-A148 863/4/GAR *515,078*

KUERTEN, R.
Magnetic Inductive Flowmeter for Low Conducting Liquids.
N85-13216/5/GAR *515,225*

KULSRUD, R.
Collective Effects in Spin Polarized Plasmas.
DE85002702/GAR *515,572*

KUO, K. K.
Recovery of Damaged Solid Propellants by Interrupting Burning and Crack-Propagaton Processes,
AD-P004 343/0/GAR *515,698*

KURY, J.
Measurement of Shock Induced Reaction in Rocket Propellants by Nanosecond Infrared Radiometry and Photography,
AD-P004 349/7/GAR *515,701*

LADELL, L.
Digital Radio Link: Wave Propagation Measurements Using Narrow Band Technique.
N85-13152/2/GAR *515,291*

LADINSKY, H.
Anticholinesterase Effects on Number and Function of Brain Muscarinic Receptors and Central Cholinergic Activity: Drug Intervention.
AD-A148 973/1/GAR *514,640*

LAGO, A. M.
Environmental Aspects of Transportation,
PB85-145134/GAR *515,111*

LAMB, J. C.
Di(n-Butyl) Phthalate: Reproduction and Fertility Assessment in CD-1 Mice When Administered in the Feed.
PB85-144798/GAR *514,673*

LAMBERT, O.
Application of the Onera Model of Dynamic Stall.
N85-12862/7/GAR *514,318*

LANDFERMANN, H.
Preparation of Sinter-Active Silicon Carbide Powders.
N85-12962/3/GAR *514,978*

LANGAM, N. N.
Technology Change in the Philippine Agricultural Machinery Industry,
PB85-141695/GAR *514,365*

LANGER, W. D.
Two-Chamber Model for Divertors with Plasma Recycling.
DE85002711/GAR *515,335*

LANGFORD, D. A.
Co-Production of Gas and Water, Third Year.
PB85-156974/GAR *514,769*

LAPIERRE, L.
Conception de Circuits Assistee Par Ordinateur: Realisation de Masques pour l'Elaboration de Circuits Microondes (Computerized Circuit Designs: Realization of Masks to Manufacture Microwave Circuits).
N85-13168/8/GAR *515,150*
Simulation d'Une Chaine de Transmission a Elements Faiblement Non Lineaires. Calculs des Produits d'Intermodulation sur UN Signal Compose de N Porteuses (Simulation of a Transmission Circuit Composed of Slightly Nonlinear Elements. Computation of the Intermodulation on Signals Composed of N Carriers).
N85-13167/0/GAR *514,859*

LARI, R. J.
3D Field Calculation of the GEM Prototype Magnet and Comparison with Measurements.
DE85003040/GAR *515,561*

LAROCHE, M. A.
Corrosions des Laitons de Robinetterie (Corrosion of Brass in Potable Water Service).
N85-13037/5/GAR *514,994*

LARSON, D. C.
Office of Basic Energy Sciences Program to Meet High Priority Nuclear Data Needs of the Office of Fusion Energy: Summary of Results 1976-1983.
DE85001699/GAR *515,323*

LARUELLE, G.
Etudes Aerodynamiques Liees au Developpement des Divergents Deployables (Aerodynamic Studies of Deployment Devices),
PB85-140911/GAR *515,277*

LASRY, J. M.
Remark on Regularization in Hilbert Spaces.
AD-A149 046/5/GAR *515,027*

LAUENROTH, W. K.
Effects of SO2 on a Grassland: A Case Study in the Northern Great Plains of the United States,
PB85-137354/GAR *514,371*

LAUFFER, J. P.
Mini-Modal Testing of Wind Turbines Using Novel Excitation.
DE85000666/GAR *514,902*

LAWLESS, J. L.
Fundamental Studies on MPD(Magneto Plasma Dynamics) Thrusters.
AD-A149 074/7/GAR *515,600*

LAWRENCE, A. J.
Modelling and Residual Analysis of Nonlinear Auto-Regressive Time Series in Exponential Variables.
AD-A149 047/3/GAR *515,028*

LAWRENCE, R. A.
Conference Proceedings of Engine Cyclic Durability by Analysis and Testing.
AD-A149 028/3/GAR *515,680*

LAWSON, M. B.
Water-Lithium Bromide Double-Effect Absorption Cooling Analysis. Final Report.
DE85002757/GAR *515,072*

LAWTON, A. D.
Di(n-Butyl) Phthalate: Reproduction and Fertility Assessment in CD-1 Mice When Administered in the Feed.
PB85-144798/GAR *514,673*

LAXER, D.
Etudes des Correlations Vitesse-Pression Acoustique Conditionnees sur le Signe et l'Amplitude de la Fluctuation de Vitesse dans UN Jet Froid (Study of the Velocity-Acoustic Pressure Correlation in a Cold Jet, Centered on the Sign and the Amplitude of the Velocity Fluctuations).
N85-13193/6/GAR *515,516*

LE LANN, G.
Distributed Data Processing Design Methodology.
AD-A148 888/1/GAR *514,804*

LE MEUR, A.
Exploitation de Calculs Tridimensionnels dans les Compresseurs Transsoniques (Development of Computations of Three Dimensional Flow through Transonic Compressors),
PB85-140903/GAR *515,540*

LEACHMAN, C. A.
Financial Leverage Potential of Local Currency Proceeds Generated from the Food for Peace Program to Stimulate Private Enterprise in Developing Countries,
PB85-143097/GAR *514,481*

LEAHY, R. B.
Structural Design Guidelines for Heliports.
AD-A148 967/3/GAR *514,345*

LECURU, D.
Seuil de Detectabilite des Defauts dans les Assemblages Rives, Proces-Verbal No.44-833/F (Defect Detection Threshold in Riveted Joints, Test Report No.44-833/F).
N85-13260/3/GAR *515,256*

LEDEBRINK, F. W.
Method of Final Conditioning of Solid Radioactive Wastes.
DE85900002/GAR *515,417*

LEDESMA, A. J.
Landless Workers and Rice Farmers: Peasant Subclasses Under Agrarian Reform in Two Philippine Villages,
PB85-142644/GAR *514,351*

LEE, C. R.
Environmental Impact Research Program. Restoration of Pyritic Soils and the Quantification of Erosion Control.
AD-A148 946/7/GAR *514,779*

LEE, E. L.
Detonation E.O.S. Patterns for Several Explosives.
DE85001039/GAR *515,499*

LEE, J. G.
Reactive Sintering of SiC.
N85-13010/2/GAR *514,960*

LEE, W. H.
Conceptual Design for Scaled Truss Antenna Flight Experiment.
N85-12932/8/GAR *515,717*

LEE, Y.
LANDSAT Instruments Characterization.
N85-13356/9/GAR *514,822*

LEE, Y. H.
Analysis of the Impact of Error Detection on Computer Performance.
N85-13477/3/GAR *514,824*

Unified Method for Evaluating Real-Time Computer Controllers: A Case Study.
N85-13478/1/GAR *514,342*

LEINING, R. B.
Preventing Explosive Propagation in Racks or Containers of Tactical Missiles,
AD-P004 342/2/GAR *515,275*

LEINWEBER, G.
Bubble-Induced Mixing of Two Horizontal Liquid Layers with Non-Uniform Gas Injection at the Bottom.
DE85000097/GAR *515,377*

LEMONNIER, P. E.
Etude Experimentale d'une Couche Limite Turbulente Incompressible sur une Paroi Courbe (Experimental Study of a Turbulent Incompressible Boundary Layer on a Curved Wall).
PB85-145001/GAR *515,541*

LENNOX, R. B.
Plasticity, Agglomeration and Volatiles Secondary Reactions in Coal Pyrolysis. Annual Report, September 10, 1982-February 29, 1984.
DE85002492/GAR *515,655*

LEOPOLD, D.
Study of Flow Past an Airfoil with a Jet Issuing from Its Lower Surface.
N85-12860/1/GAR *514,316*

LEPPLA, S. H.
Anthrax Toxin,
AD-A148 936/8/GAR *514,668*

Crystallization of the Protective Antigen Protein of Bacillus anthracis,
AD-A148 938/4/GAR *514,634*

LESANT, Y.
Adaptation de Parois a Mach 1.2 (Wall Adaptation at Mach 1.2).
N85-12873/4/GAR *515,213*

LESSER, V.
Design of a Knowledge-Based Fault Detection and Diagnosis System,
AD-A148 859/2/GAR *514,422*

LESSER, V. R.
Coordination in a Distributed Problem Solving Network,
AD-A148 925/1/GAR *514,425*

A Debugging Tool for Distributed Systems.
AD-A148 916/0 *514,807*

Distributed Vehicle Monitoring Testbed: A Tool for Investigating Distributed Problem Solving Networks,
AD-A148 917/8/GAR *514,424*

Distributing a Distributed Problem Solving Network Simulator,
AD-A149 065/5/GAR *514,816*

Functionally Accurate, Cooperative Distributed Systems.
AD-A148 926/9 *514,808*

Meta-Level Control through Fault Detection and Diagnosis,
AD-A149 064/8/GAR *514,815*

Use of Meta-Level Control for Coordination in a Distributed Problem Solving Network,
AD-A148 915/2/GAR *514,423*

LESSLEY, S. D.
Hill AFB, Utah Installation Restoration Program. Phase IIB, IRP Survey. Volume 1. Text. Volume 2. Appendices.
AD-A149 013/5/GAR *514,742*

LESTER, D. F.
Far-Infrared Photometry of Compact Extragalactic Sources: OJ 187 and BL Lac.
N85-13701/6/GAR *514,389*

LESTER, L. N.
Array Processor Utilisation in the Computation of Real-Time Images.
AD-A149 051/5/GAR *515,302*

LETICHE, M.
Bruit Robinet/Fluctuations de Pression. Etude du Comportement Acoustique des Equipments Hydrauliques du Batiment en Fonction de la Temperature (Tap Noise-Pressure Fluctuations. Study of the Acoustic Behavior of Hydraulic Equipment in Buildings as a Function of the Temperature).
N85-13201/7/GAR *515,179*

LEUNG, R. C. N.
Vibrational Power Transmission of an Idealised Gearbox.
PB85-139632/GAR *515,170*

LEVELT SENGERS, J. M. H.
Semi-Automated Facilities for Measuring Density, PVT and VLE of Energy-Related Fluids.
PB85-151785 *514,723*

Thermodynamic Properties of Isobutane-Isopentane Mixtures from 240 to 600K and up to 20 MPa (with Supplemental Tables from -40 to + 600F and up to 1000 psia).
PB85-154581/GAR *514,725*

Universal Representation of the Thermodynamic Properties of Fluids in the Critical Region.
PB85-151793 *514,724*

LEVESQUE, J.
Essai 17.208: Statistique sur les Caracteristics de Base des Composites Carbone-Epoxy (Traction) (Test Report No. 17.208: Statistics of the Basic Characteristics of Carbon-Epoxy Composites).
N85-12979/9/GAR *514,975*

LEVINE, J. M.
Fire Support Team Vehicle (FIST-V) System: An Analysis of Human Factors, Training, Safety and Related Considerations.
AD-A149 070/5/GAR *515,504*

LEVINE, L.
Skeletal Muscle Metabolism during Exercise is Influenced by Heat Acclimation,
AD-A148 845/1/GAR *514,658*

LEVUSH, B.
Free Electron Laser with a Rotating Quadrupole Wiggler.
AD-A149 052/3/GAR *515,545*

LEWIS, P. A. W.
Modelling and Residual Analysis of Nonlinear Auto-Regressive Time Series in Exponential Variables.
AD-A149 047/3/GAR *515,028*

LI, B. L.
Some Addition and Complexation Reactions of a Silylated Amino(Methylene)Phosphine.
AD-A149 042/4/GAR *514,683*

LIANG, D. F.
Strapdown Navigation Algorithms Implemented in the Inertial and Geographic Frames.
AD-A148 908/7/GAR *515,301*

LIBBY, R. T.
Mistranslation of the mRNA Encoding Bacteriophage T7 0.3 Protein.
AD-A148 875/8/GAR *514,632*

LIEBERMAN, M. L.
CP DDT Detonators. II. Output Characterization.
DE84017251/GAR *515,497*

LIGHTBOURNE, R. E.
Comparative Studies. Cross National Summaries Number 14: Family Size Preferences,
PB85-141828/GAR *514,554*

LILES, D. R.
Los Alamos Nuclear Plant Analyzer: An Interactive Power-Plant Simulation Program.
DE85002412/GAR *515,445*

LIMA, P. M.
Environmental Aspects of Transportation,
PB85-145134/GAR *515,111*

LIN, C.
Ambiguity Function of Random Binary-Phase-Coded Waveforms,
AD-A148 906/1/GAR *514,857*

LIN, P. W.
Project on Sulfur Dioxide Removal and Waste Products Utilization Process. Final Report.
DE84017333/GAR *515,084*

LIN, S.
Undetected Error Probability for Shortened Hamming Codes.
N85-13535/8/GAR *514,860*

LIND, M.
Dynamic Decision Making.
N85-13668/7/GAR *515,055*

LINDER, F.
Fiabilite Composants et Technologies d'Assemblage (Component Reliability and Assembling Technologies).
N85-13258/7/GAR *515,153*

Les Composants Electronics pour Applications Spatiales (Electronic Components for Space Applications).
N85-13169/6/GAR *514,849*

LINHOLM, L. W.
Comments on 'Determining Specific Contact Resistivity from Contact End Resistance Measurements'.
PB85-151678 *514,796*

LINSKY, J. L.
RS CV sub n Binary Systems.
N85-13704/0/GAR *514,392*

LINTON, A.
Communication System Supporting Large Datagrams on a Local Area Network.
PB85-139798/GAR *514,834*

LINTZ, C.
Geomorphology and Archaeology of Carnegie Canyon, Fort Cobb Laterals Watershed, Caddo County, Oklahoma.
PB85-144673/GAR *514,511*

LIONS, P. L.
Hamilton-Jacobi Equations in Infinite Dimensions. Part 1. Uniqueness of Viscosity Solutions,
AD-A149 094/5/GAR *515,035*

Remark on Regularization in Hilbert Spaces.
AD-A149 046/5/GAR *515,027*

LIOW, J.
Study of Seismicity and Earthquake Hazard in Northern Alabama and Adjacent Parts of Tennessee and Georgia.
NUREG/CR-4058-V1/GAR *514,772*

LIPINSKY, E. S.
Ethanol from Sugar Crops: A Critical Review,
PB85-140176/GAR *515,671*

LIPP, A.
Development and Fabrication of Refractory Bodies for Gas Turbine Engines.
N85-12899/9/GAR *515,686*

LIPPINCOTT, E. P.
Standardized Physics-Dosimetry for US Pressure Vessel Cavity Surveillance Programs.
DE85002236/GAR *515,444*

LIPPMANN, B. A.
Single-Cavity SLED Device.
DE85002587/GAR *515,556*

LIPVIN-SCHRAMM, S.
Structures to Resist the Effects of Accidental Explosions. Volume 3. Principles of Dynamic Analysis.
AD-A148 895/6/GAR *515,190*

LITHGOW, R. A.
Water-Lithium Bromide Double-Effect Absorption Cooling Analysis. Final Report.
DE85002757/GAR *515,072*

LIU, Y. Y.
Steady-State and Transient Fission Gas Release and Swelling Model for LIFE-4.
DE84014730/GAR *515,421*

Thermal Conductivities for Sintered and Sphere-Pac Li sub 2 O and gamma exp - LiAlO sub 2 Solid Breeders with and Without Irradiation Effects.
DE85000775/GAR *515,315*

LLOPIS, J. L.
Military Hydrology. Report 6. Assessment of Two Currently 'Fieldable' Geophysical Methods for Military Ground-Water Detection.
AD-A148 988/9/GAR *514,755*

LOESER, A.
Development of a Feasibility Model for a Thin-Film Precision Power Meter.
N85-13217/3/GAR *515,226*

LOEWY, R. G.
Composite Structural Materials.
N85-12966/6/GAR *514,974*

LOGAN, K. V.
Program to Develop Thermite Reactions to Produce Refractory Borides and Carbides.
AD-A148 972/3/GAR *515,145*

LOMBARD, J. A.
Role of Mining in the South African Economy,
PB85-139228/GAR *514,467*

LONG, L. T.
Study of Seismicity and Earthquake Hazard in Northern Alabama and Adjacent Parts of Tennessee and Georgia.
NUREG/CR-4058-V1/GAR *514,772*

LONGBOTTOM, J. A.
Some Issues in Dynamic Modelling and Forecasting,
PB85-139350/GAR *514,468*

KEYWORD INDEX

LOPEZ, R.
Prevalencia de Bocio Endemico en la Poblacion escolar de Bolivia (Prevalence of Endemic Goiter in the School Population of Bolivia).
PB85-137925/GAR *514,505*

LOREE, T. R.
Laser-Based Diagnostics for Coal Gasification Instrumentation.
DE85002385/GAR *515,652*

LORENZ, R. A.
Iodine Sorption/Desorption from Low-Alloy Steel and Graphite. Draft.
DE85000966/GAR *515,477*

LOSS, W.
Evaluation of Modifications to the Mastin Double-Envelope House.
DE85002786/GAR *514,913*

LOUIS, J. F.
Study of Deposition Control Using Transpiration. Technical Progress Report, September 1984.
DE85000215/GAR *515,682*

LOWENDORF, H. S.
Biological Nitrogen Fixation in Flooded Rice Fields.
PB85-143782/GAR *514,377*

LOWRY, D.
Reflections on Britain's Nuclear History: A Conversation with Lord Hinton.
PB85-139269/GAR *515,372*

LUDEWIGT, B.
GSI-LBL Plastic Ball/Wall Spectrometer.
DE85001651/GAR *515,351*

LUGO-LOPEZ, M. A.
Pigeonpeas (Cajanus cajan Millisp.): A Valuable Crop of the Tropics,
PB85-143105/GAR *514,375*

LUMM, D. K.
Structural Geology of Southeastern Illinois and Vicinity.
NUREG/CR-4038/GAR *514,744*

LUPSON, W. F.
Improving the Fatigue Life of the Mirage IIIO Wing Main Spar.
AD-A149 054/9/GAR *514,333*

LURIA, S. M.
Effect of Extreme Peripheral Light on Dark Adaptation.
AD-A148 923/6/GAR *514,647*

Individual Differences in Chromatic Brightness Matching.
AD-A148 862/4/GAR *515,549*

Relative Effectiveness of Red and White Light for Subsequent Dark-Adaptation.
AD-A148 863/2/GAR *514,662*

LURIE, C.
Space Power Distribution System Technology. Volume 3. Test Facility Design.
N85-12936/9/GAR *515,719*

LURIE, E. R.
Readjustment of Older Persons After Acute Hospitalization.
PB85-147494/GAR *514,597*

LUSARDI, A.
NATO AC/310 Activities Report on NATO STANAG 4170 and Allied Ordnance Publication 7, AOP-7 (Manual of Tests for Qualification of Explosive Materials for Military Use).
AD-P004 341/4/GAR *515,494*

LUSSIER, S.
Evaluation of Methods to Measure the Acute Toxicity of Sewage Sludge.
PB85-144061/GAR *515,103*

LUTHY, W.
Dynamic Stark-Effect in Thallium.
PB85-143204/GAR *514,712*

LUTON, J. N.
Startup of Large Coil Test Facility.
DE85001669/GAR *514,789*

LUYTEN, J. R.
On the Dynamics of the Coupled Mixed Layer-Thermocline System and the Determination of the Oceanic Surface Density.
AD-A148 968/1 *514,737*

LYCZKOWSKI, R. W.
Three-Dimensional Analysis of Heat Transfer and Gas Flow in a Radiant Furnace.
DE84011732/GAR *515,060*

LYNCH, V. E.
Calculation of Stellarator Equilibria in Vacuum Flux Surface Coordinates.
DE85001693/GAR *515,322*

LYONS, P. L.
Neumann Type Boundary Conditions for Hamilton-Jacobi Equations.
AD-A149 069/7/GAR *515,031*

MA, M. T.
Error Analysis of Radiation Characteristics of an Unknown Interference Source Based on Power Measurements.
PB85-147999 *514,650*

MABEY, W. R.
Environmental Fate Studies of HMX Screening Studies. Phase 1.
AD-A148 978/0/GAR *515,493*

MACDONALD, A. L.
Comparative Studies. Cross National Summaries Number 14: Family Size Preferences,
PB85-141828/GAR *514,554*

MACHIN, A. S.
Improving the Fatigue Life of the Mirage IIIO Wing Main Spar.
AD-A149 054/9/GAR *514,333*

MACLENNAN, B. J.
Computable Real Analysis,
AD-A149 079/8/GAR *515,032*

MACNEILL, A.
Feasibility Study of Alternative Technology for Small Community Water Supply.
PB85-143287/GAR *515,102*

MACNEILL, J. S.
Feasibility Study of Alternative Technology for Small Community Water Supply.
PB85-143287/GAR *515,102*

MADEY, T. E.
Characterization of Surfaces Using Electron and Photon Stimulated Desorption.
PB85-151587 *514,718*

MAEWAL, A.
Finite Element Analysis of Nonlinear Oscillations and Flutter of Shells of Revolution.
AD-A149 071/3/GAR *515,577*

MAGEE, J.
Distributed Data Processing Design Methodology.
AD-A148 868/1/GAR *514,804*

MAHAFFY, J. H.
Los Alamos Nuclear Plant Analyzer: An Interactive Power-Plant Simulation Program.
DE85002412/GAR *515,445*

MAHAJAN, B. M.
Short Duration Winter-Time Performances of Different Passive Solar Systems.
DE85000850/GAR *515,067*

MAHONEY, A. R.
Accelerated Aging of Aluminized Acrylic Solar Mirror Materials.
DE85002683/GAR *514,911*

MAHONEY, T.
Private Sector and the Economic Development of Malawi.
PB85-140606/GAR *514,473*

MAIER, J.
Untersuchung der K Wechselwirkung bei Stossenergien Zwischen 0.5 und 5.7 Ev (Investigation on K (4 2P3/2) Hg Interaction at Collision Energies from 0.5 to 5.7 Ev).
N85-13589/5/GAR *514,709*

MAINE, D.
Planning Familial: Son Effet sur la Sante de la Femme et de l'Enfant (Family Planning: Its Effect on the Health of the Woman and Child).
PB85-141729/GAR *514,589*

MAISCHBERGER, K.
Improved Sensitivities in Laser Interferometers for the Detection of Gravitational Waves.
N85-13232/2/GAR *515,574*

MAJJIGI, R. K.
Experimental Investigation of Shock-Cell Noise Reduction for Dual-Stream Nozzles in Simulated Flight.
N85-13549/9/GAR *515,687*

MAJOR, E. O.
Immortal Line of Human Fetal Glial Cells.
PAT-APPL-6-657 830/GAR *514,572*

MALAVIYA, B. K.
Integrated-Blanket-Coil (IBC) Concept Applied to the Poloidal Field and Blanket Systems of a Tokamak Reactor.
DE85000437/GAR *515,312*

MALENFANT, R. E.
Market Study of International Needs for New Electric Generating Capacity.
DE84014042/GAR *514,878*

MALLER, O.
Psychophysical Bases for the Sensory Assessment of Rations.
AD-A148 849/3/GAR *514,541*

MALLOW, W. A.
Photosynthesis of Ammonia.
DE85001482/GAR *514,677*

MALUEG, K. W.
Biological Methods for Determining Toxicity of Contaminated Freshwater Sediments to Invertebrates.
PB85-144103/GAR *514,672*

MANDANIS, G.
Graphische Software Zur Darstellung der Deformationsbewegung Eines Koerpers (Graphics Software for the Display of Body Deformation Motion).
N85-12888/2/GAR *514,336*

MANDRELL, R. E.
Monoclonal Antibodies to Serotype 2 and Serotype 15 Outer Membrane Proteins of Neisseria meningitidis and Their Use in Serotyping.
AD-A148 970/7/GAR *514,581*

MANGELSDORFF, A. D.
Proceedings: Second User's Workshop on Combat Stress Held at Fort Sam Houston, Texas on 29-30 April 1982.
AD-A149 034/1/GAR *514,663*

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AD-A149 035/8/GAR *514,664*

MANHEIMER, W. M.
Free Electron Laser with a Rotating Quadrupole Wiggler.
AD-A149 052/3/GAR *515,545*

MANN, J. E.
Status Report on the ORNL (Oak Ridge National Laboratory) 25 URC Accelerator.
DE85002498/GAR *515,554*

MANN, J. Y.
Improving the Fatigue Life of the Mirage IIIO Wing Main Spar.
AD-A149 054/9/GAR *514,333*

MANTZARAS, J.
Recovery of Damaged Solid Propellants by Interrupting Burning and Crack-Propagaton Processes,
AD-P004 343/0/GAR *515,698*

MARAIS, C.
Interaction Fatigue - Fluage dans les Composites Carbone/Resine + or - 45 degrees (Interaction Fatigue - Creep in Carbon/Resin Compounds + or - 45 degrees),
PB85-141588/GAR *514,982*

MARCHATERRE, J. F.
Integral Fast Reactor Concept.
DE84015828/GAR *515,433*

MARCOTTE, R.
Interstate Pipeline's Annual Report of Gas Supply, 1981-1983 (FERC-15).
PB85-128064/GAR *514,768*

MARCUS, S. I.
Research in Adaptive and Decentralized Control.
AD-A148 964/0/GAR *515,020*

MARCY, M.
Evaluation of Methods to Measure the Acute Toxicity of Sewage Sludge,
PB85-144061/GAR *515,103*

MARGOLA, A.
Waste Water Pollution Management and Control in the Petrochemical and Plastics Processing Industry,
PB85-145043/GAR *515,005*

MARKIN, J. T.
Application of Wald's Sequential Probability Ratio Test to Nuclear Materials Control.
DE85002017/GAR *515,479*

MARKOWICH, P. A.
Asymptotic Representation of Solutions of the Basic Semiconductor Device Equations.
AD-A149 040/8/GAR *514,783*

MARRAFFA, L.
Exploitation de Calculs Tridimensionnels dans les Compresseurs Transsoniques (Development of Computations of Three Dimensional Flow through Transonic Compressors),
PB85-140903/GAR *515,540*

MARSDEN, J. E.
Richardson Number Criterion for the Nonlinear Stability of Three-Dimensional Stratified Flow.
AD-A148 971/5/GAR *515,528*

MARSH, B. D.
Lithospheric Structure in the Pacific Geoid.
N85-13365/0/GAR *514,739*

MARSHALL, B. R.
Applications of Pulsed-Laser Techniques and Thermographic Phosphors to Dynamic Thermometry of Rotating Surfaces.
DE85000403/GAR *515,202*

MARTIN, G. B.
Reducing Pollutant Emissions by Fines Removal.
PATENT-4 485 747 *515,090*

MARTIN, R. E.
Regenerative Fuel Cell Energy Storage System for a Low Earth Orbit Space Station.
N85-13371/8/GAR *514,945*

MASSA, F.
Search for the Radiative Decay of a Cosmic Relic Particle with IUE.
N85-13707/3/GAR *514,394*

MASTIN, E. W.
Transformation of Two and Three-Dimensional Regions by Elliptic Systems.
N85-13529/1/GAR *515,041*

MATHISEN, H. M.
Ventilation Efficiency. Part 4. Displacement Ventilation in Small Rooms,
PB85-140879/GAR 515,073

MATKOWSKY, B. J.
Research in Nonlinear Problems of Energy. Informal Technical Progress Report.
DE85001529/GAR 515,596

MAX, S. E.
Modulation of the Cytosolic Androgen Receptor in Striated Muscle by Sex Steroids.
N85-13468/2/GAR 514,642

MAY, J. R.
Startup of Large Coil Test Facility.
DE85001669/GAR 514,789

MAYER, H.
Essai 17.202: Caracterisation de Resine Polyimide (Polyimide Resin Characteristics, Test).
N85-13049/0/GAR 514,979

MAYER, W. G.
Linear and Nonlinear Ultrasonic Interaction on Liquid-Solid Boundaries.
AD-A148 979/8/GAR 515,514

MAYNARD, R.
Process and Implementation Issues in the Design and Conduct of Programs to Aid the Reemployment of Dislocated Workers,
PB85-146702/GAR 514,539

MAYO, C. W.
Report of the First United States Conference on Utility Experience with Neutron Noise Analysis.
DE85002459/GAR 515,447

MAYO, M. B.
Archaeological Investigations at the Spring Creek Site (34Ln-76), Lincoln County, Oklahoma.
PB85-144657/GAR 514,510

MAZER, J. A.
Comments on 'Determining Specific Contact Resistivity from Contact End Resistance Measurements'.
PB85-151678 514,796

MCALISTER, K. W.
Application of the Onera Model of Dynamic Stall.
N85-12862/7/GAR 514,318

MCCANDLESS, S. W.
Ocean Services User Needs Assessment. Volume 1. Survey Results, Conclusions and Recommendations.
N85-13445/0/GAR 514,447

MCCARTHY, J. E.
Direct Coal Combustion Data Handbook.
DE85001028/GAR 515,624

MCCARTHY, P. E.
Drinking and Driving Habits, Attitudes, and Behaviour of Male Motorists.
PB85-138436/GAR 514,548

MCCARTY, K. F.
Hydrodesulfurization by Reduced Molybdenum Sulfides: Activity and Selectivity of Chevrel Phase Catalysts.
DE85002613/GAR 514,698

MCCARTY, K. P.
Summary of the Mechanism of Delayed Detonation,
AD-P004 347/1/GAR 515,508

MCCARTY, R. D.
Thermodynamic Properties of Ethylene at Saturation.
PB85-151777 514,722

MCCAULEY, E. W.
Use of the ORACLE DBMS in Determining the Response of Complex Scientific Instrumentation.
DE85001742/GAR 515,328

MCCLUNG, R. W.
Eddy-Current Inspection for Steam Generator Tubing Program Semiannual Progress Report for Period Ending June 30, 1984.
NUREG/CR-3949-V1/GAR 515,177

MCCONVILLE, R.
Comparison of XEDS and EELS Using Conventional Beryllium Window and Windowless Detectors.
DE85002734/GAR 515,212

MCCORD, K.
Design of Energy-Responsive Commercial Buildings.
DE84013046/GAR 515,062

MCCRADY, J. K.
Effects of Copper, Nickel and Zinc on the Life Cycle of the Caddisfly 'Clistoronia magnifica' (Limnephilidae).
PB85-144111/GAR 514,573

MCCUNE, B. P.
Knowledge based Programming Applications,
AD-A148 913/7/GAR 514,806

MCDONALD, J. A.
Smoothing with Split Linear Fits,
AD-A149 032/5/GAR 515,024

MCDOWELL, R. E.
Animal Traction: Guidelines for Utilization.
PB85-146058/GAR 514,369

MCELIGOT, D. M.
Internal Forced Convection to Low Prandtl Number Gas Mixtures.
AD-A148 932/7/GAR 515,587

MCELROY, W. N.
Standardized Physics-Dosimetry for US Pressure Vessel Cavity Surveillance Programs.
DE85002236/GAR 515,444

MCFERSON, H. M.
Private Sector: Ethnicity, Individual Initiative, and Economic Growth in an African Plural Society. The Bamileke of Cameroon.
PB85-140192/GAR 514,552

MCGEEHAN, D. D.
Environmental Aspects of Transportation,
PB85-145134/GAR 515,111

MCGINTY, D. M.
ELAF Failed Fuel Plate Examination.
DE85002516/GAR 515,480

MCGOWAN, J. J.
Direct Comparison of Unloading Compliance and Potential Drop Techniques in J-Integral Testing.
DE85001550/GAR 514,988

MCGUIRE, R. R.
DOE Hazard Classification for Insensitive High Explosives (IHE).
DE84017002/GAR 515,496

MCINNIS, B. C.
NASA/ASEE Summer Faculty Fellowship Program, 1984.
N85-13662/0/GAR 514,490

MCJUNKIN, F. E.
Water and Human Health,
PB85-144723/GAR 515,110

MCKAY, D. B.
Crystallization of the Protective Antigen Protein of Bacillus anthracis,
AD-A148 938/4/GAR 514,634

MCKAY, R. A.
International Test and Demonstration of a 1-Mw Wellhead Generator: Helical Screw Expander Power Plant.
N85-13372/6/GAR 514,946

MCKENNA, H. E.
Observed Acoustic and Aeroelastic Spectral Responses of a MOD-2 Turbine Blade to Turbulence Excitation.
DE84013012/GAR 514,876

MCKNIGHT, R. H.
Capacitive Sensors for Voltage Measurements in Pulse Power Systems.
PB85-144962 515,244

MCLEMORE, O. F.
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AD-A148 966/5/GAR 515,270

MCMANUS, G. J.
Determination of Iodine Specific Activity in Nuclear Fuel Reprocessing Plant off-Gases.
DE85000193/GAR 515,475

MCNEECE, J. P.
Interactive and Automated Systems for Nuclear Track Measurements with Applications to Fast Neutron Dosimetry.
DE85002240/GAR 515,353

MCNEESE, J. A.
Recent Development in Pyrochemistry at Los Alamos.
DE85000174/GAR 515,388

MECHANIC, H. F.
Army Nurse Corps Personnel Management Practices (Executive Summary).
AD-A148 890/7/GAR 514,579

MEDALIA, D.
Case Management and Prepaid Capitation as a Cost-Effective and Improved Method of Delivery of Dental Services: Massachusetts Dental Project.
PB85-146116/GAR 514,595

MEDDLES, A. D.
Use of a Commercial Ranging System in Field Surveys of Radioactively Contaminated Sites.
DE85002384/GAR 515,354

MEEKHOF, R.
Federal Credit Programs for Agriculture: Background for 1985 Farm Legislation.
PB85-138923/GAR 514,348

MEGAHAN, J.
Development of Soft Excavation Techniques, Phases 2 and 2A.
PB85-152817/GAR 515,124

MEISL, C. J.
Safety Aspects of Prepackaged Liquid Propellant Stages for Strategic Missiles,
AD-P004 350/5/GAR 515,702

MEISSNER, F.
Fuel Savings by Advanced Vehicle Drive Systems.
DE84770472/GAR 515,126

MEISTER, H.
Coolability of UO sub 2 with Downward Heat Removal: The D10 Experiment.
DE84017007/GAR 515,374

MEKEMSON, J. R.
Guidelines for Left-Turn Treatments at Signal Controlled Intersections.
PB85-144327/GAR 515,108

MELLIERE, R. A.
Conference Proceedings of Operational Loads Data Held at Sienna, Italy on 2-6 April 1984,
AD-A149 025/9/GAR 514,329

MELLINGER, P. J.
Krypton-85 Health Risk Assessment for a Nuclear Fuel Reprocessing Plant.
DE85000838/GAR 514,615

MELMED, A. J.
Approach to Realism in Field Ion Microscopy via Zone Electropolishing.
PB85-151579 515,249
Atomic Structure and Optical Constants of (001) Tantalum.
PB85-151629 515,525

MELTZ, M. L.
Genetic Effects of Microwave Exposure on Mammalian Cells in Vitro. Volume 2. Appendix A. Cytogenetics and Growth Kinetics Data, 850 MHz.
AD-A148 866/7/GAR 514,652
Genetic Effects of Microwave Exposure on Mammalian Cells in Vitro. Volume 2. Appendix B. Cytogenetics and Growth Kinetics Data, 1.2 GHz.
AD-A148 867/5/GAR 514,653

MENGELKAMP, H. T.
Test Field Pellworm for Wind Turbines.
DE84752110/GAR 514,882

MENLOVE, H. O.
Universal Fast Breeder Reactor Subassembly Counter Manual.
DE85001523/GAR 515,349

MENYUK, C. R.
Raman Sidescattering in Laser-Produced Plasmas.
AD-A148 905/3/GAR 515,569

MEONI, N. W.
Military Industrial Complex: A Discussion of Selected Issues.
AD-A148 873/3/GAR 514,494

MERCIER, O. L.
Robustesse de Regulateurs de Pilotage Multivariables (Strength of Multivariable Piloting Regulators),
PB85-141570/GAR 514,344
Robustesse des Regulateurs de Pilotage Multivariables Continus: Synthese de l'Etude (Strength of Continuous Multivariable Piloting Regulators: Study Synthesis),
PB85-140853/GAR 514,343

MERRILL, W. W.
Separation of Helium-Methane Mixtures by Single-Column Pressure Swing Adsorption.
DE85002785/GAR 514,699

MERTEN, G. P.
Follow-On 40-kW Field Test Support.
PB85-151322/GAR 514,926

MESHENBERG, M. J.
Energy Supply and Use in United States Localities: The Institutional and Legal Setting.
DE85002249/GAR 514,908

MESSERSCHMID, E.
Carrier Acquisition and Tracking by a COSTAS Loop with Automatic Frequency Control.
N85-13149/8/GAR 515,288

METTING, N. F.
Portable Microdosimetry System.
DE85000841/GAR 514,655

METZE, G. M.
Metal-Semiconductor Field-Effect Transistors Fabricated in GaAs Layers Grown Directly on Si Substrates by Molecular Beam Epitaxy.
AD-A149 001/0/GAR 514,782

MEYER, P.
Etude Par Anemometrie Laser d'Ecoulements Decolles sur des Profils d'Aile (Laser Anemometer Study of Separated Flow on Wing Profiles).
N85-12872/6/GAR 514,324

MEYER, R. E.
Progress in Evaluation of Radionuclide Geochemical Information Developed by DOE (Department of Energy) High-Level Nuclear Waste Repository Site Projects: Report for April-June 1984.
NUREG/CR-3851-V3/GAR 515,419

MEYER, R. L.
Effects of Low Interest Rates on the Poor in Low Income Countries,
PB85-143014/GAR 514,353

KEYWORD INDEX

MICHAELS, K. B.
Regenerative Fuel Cell Energy Storage System for a Low Earth Orbit Space Station.
N85-13371/8/GAR *514,945*

MIGNOSI, A.
Premiers Essais Cryogeniques du Profil Cast 7 a la Soufflerie T2. Comparaisons Avec les Calculs (First Cryogenic Test of the Cast 7 Profile in the T2 Wind Tunnel. Comparison with Calculations).
N85-13682/8/GAR *514,325*

MIKES, F.
Development of Acceptance Criteria for Batches of Silane Primer for External Tank Thermal Protection System Bonding Applications.
N85-13043/3/GAR *514,681*

MIKKELSEN, K. W.
Technology Change in the Philippine Agricultural Machinery Industry.
PB85-141695/GAR *514,365*

MILIOS, E. E.
Object-Oriented Signal Processing Environment: The Knowledge-Based Signal Processing Package.
AD-A148 963/2/GAR *514,809*

MILLER, D. C.
Evaluation of Methods to Measure the Acute Toxicity of Sewage Sludge.
PB85-144061/GAR *515,103*

MILLER, K. J.
Wet Grinding Versus Dry Grinding for Deep Cleaning Ultrafine Coal by Flotation. Technical Progress Report.
DE84017066/GAR *514,756*

MILLER, L. F.
Data Acquisition and Control System for the K/sub 1C/-HSST Experiments at the ORR.
DE85001135/GAR *515,438*

MILLER, L. G.
ELAF Failed Fuel Plate Examination.
DE85002516/GAR *515,480*

MILLER, R. L.
Compact Reversed-Field Pinch Reactors (CRFPR): Preliminary Engineering Considerations.
DE85002351/GAR *515,329*

MILLER, T. L.
Preliminary Study of Numerical Simulation of Thermosolutal Convection of Interest to Crystal Growth.
N85-13175/3/GAR *515,523*

MILLIMAN, J. D.
Tidal Phase Control of Sediment Discharge from the Yangtze River.
AD-A148 576/6/GAR *514,735*

Transfer of Particulate Organic Carbon and Nitrogen from the Yangtze River to the Ocean.
AD-A148 931/9/GAR *514,752*

MILLS, W. R.
Closeout of IE Bulletin 79-09: Failures of GE Type AK-2 Circuit Breakers in Safety-Related Systems.
NUREG/CR-3791/GAR *514,790*

MISAKIAN, M.
Calibration of Flat 60-Hz Electric Field Probes.
PB85-147924 *514,566*

MISENER, T. R.
Army Nurse Corps Personnel Management Practices (Executive Summary).
AD-A148 890/7/GAR *514,579*

MISHIMA, J.
Prototype Firing Range Air Cleaning System.
DE85000360/GAR *515,176*

MISHINA, H.
Effect of Barrier Height on Friction Behavior of the Semiconductors Silicon and Gallium Arsenide in Contact with Pure Metals.
N85-13044/1/GAR *514,791*

MISHKIN, N.
Managing Permanent Objects.
AD-A149 007/7/GAR *514,813*

MITCHELL, A. C.
Detonation E.O.S. Patterns for Several Explosives.
DE85001039/GAR *515,499*

MITCHELL, G. W.
Coolability of UO sub 2 with Downward Heat Removal: The D10 Experiment.
DE84017007/GAR *515,374*

MIYAZONO, C.
Software Used with the Flux Mapper at the Solar Parabolic Dish Test Site.
N85-13376/7/GAR *514,921*

MIZUNOYA, K.
Color-Liquid-Crystal Display for Automotive Instrument Panel.
PB85-149557/GAR *515,142*

MOELLENBRUCK, W.
Mathematical Models for the Boiling Diagram of the Ideal Two-Component Mixture.
N85-13000/3/GAR *514,701*

MOHR, D.
Unprotected Loss-of-Heat Sink Simulation in the EBR-II Plant.
DE84009630/GAR *515,428*

MOLANDER, P.
Dimensionering och Finansiering av Gemensamma Resurser (Supply and Financing of Common Resources).
PB85-145910/GAR *514,486*

MONTGOMERY, D. R.
Ocean Services User Needs Assessment. Volume 1. Survey Results, Conclusions and Recommendations.
N85-13445/0/GAR *514,447*

MOORE, J. R.
Energy Management: Theory and Practice. Final Report.
DE85000646/GAR *514,901*

MOORE, N. R.
Direct Coal Combustion Data Handbook.
DE85001028/GAR *515,624*

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MOORMANN, R.
PRIAMUS: Ein Rechenprogramm zur Bestimmung Thermophysikalischer Stoffwerte von Gasmischungen Aus O2, N2, CO, CO7, He, H2O, H2 und CH4 (PRIAMUS, a Computer Program for the Calculation of Thermophysical Properties of Gas Mixtures Containing O2, N2, CO, CO2, He, H2O, H2, CH4).
N85-13002/9/GAR *514,703*

MORAN, E. E.
Monoclonal Antibodies to Serotype 2 and Serotype 15 Outer Membrane Proteins of Neisseria meningitidis and Their Use in Serotyping.
AD-A148 970/7/GAR *514,581*

MOREL, F. M. M.
Ponding of Effluents from Fossil Fuel Steam Electric Power Plants.
PB85-144244/GAR *515,106*

MORGENSTERN, M. H.
Development, Use and Control of Maintenance Procedures in Nuclear Power Plants: Problems and Recommendations.
NUREG/CR-3817/GAR *515,365*

MORIO, R. D.
Resource Management: A Prioritization Process.
AD-A149 073/9/GAR *514,523*

MORLEY, B. M.
Observational Study of Transport in the Free Troposphere.
PB85-144145/GAR *515,104*

MORRISON, G.
Thermodynamic Properties of Isobutane-Isopentane Mixtures from 240 to 600K and up to 20 MPa (with Supplemental Tables from -40 to + 600F and up to 1000 psia).
PB85-154581/GAR *514,725*

MORRISON, R. K.
Ovipositional Stimulant for Trichogramma Spp.
PATENT-4 484 539 *514,602*

MORSE, D. E.
Leadership: Structural and Functional Aspects.
AD-A149 096/0/GAR *514,547*

MORTON, J. F.
Pigeonpeas (Cajanus cajan Millsp.): A Valuable Crop of the Tropics.
PB85-143105/GAR *514,375*

MOSES, E. I.
Review of AVLIS Technology for Production-Scale LIS Systems and Construction.
DE85002002/GAR *515,338*

MOULARD, H.
Etude, par la Methode de Coin, de la Composition B2141 (SNPE): Correlation entre l'Amorcabilite et la Formulation d'un Explosif a Liant Plastique (Wedge-Technique Investigation of Composite Explosive B2141 (SNPE). Correlation between Ignitability and Formation of an Explosive with Plastic Bond).
PB85-141596/GAR *515,502*

MUDAHAR, M. S.
Energy and Fertilizer: Policy Implications and Options for Developing Countries.
PB85-144301/GAR *514,367*

MUELLER, B.
Singularitaeten-Modell Zur Analyse der Wandinterferenz in Geschlossenen Windkanalen Nach der Wanddrucksignatur-Methode (Blockierung und Auftrieb) (Singularity Model for the Analysis of Wall Interference in Closed Wind Tunnels According to the Wall Pressure Signature Method (Blockage and Lift)).
N85-12874/2/GAR *515,214*

Wandeinfluss-Korrekturen in Windkanaelen: Blockierungskorrektur Nach der Wandrucksignatur-Methode (Wall Influence Corrections in Wind Tunnels: Blockage Correction According to the Wall Pressure Signature Method).
N85-12875/9/GAR *515,215*

MUELLER, S. E.
Contingency Analysis for Construction Estimate.
DE84016252/GAR *515,195*

MUELLER, W. J. C.
Development and Testing of Thin Film Cells for High Temperature Water Vapor Electrolysis.
N85-13001/1/GAR *514,702*

MUIR, D. W.
Compact Approach to Monitored Retrievable Storage of Spent Fuel.
DE85002345/GAR *515,409*

MUKERJEE, T.
Analysis of Physical-Chemical Processes Governing SSME Internal Fluid Flows.
N85-12859/3/GAR *515,696*

MULCAHY, T. M.
Leakage-Flow-Induced Vibration of a Tube-in-Tube Slip Joint.
DE84007301/GAR *515,427*

MUNJAL, P. K.
Investment Evaluation of Solar Thermal Enhanced Oil Recovery (STEOR) Systems for Project Starts in the Years 1982 and 1986.
DE85002164/GAR *514,762*

Oil Field Data and Industry Opinions Important to the Commercialization of Solar Thermal Enhanced Oil Recovery.
DE85002153/GAR *514,760*

MUNRO, J. M.
Reducing Pollutant Emissions by Fines Removal.
PATENT-4 485 747 *515,090*

MURPHY, P. W.
Laser Program Annual Report 1983.
DE84017287/GAR *515,311*

MURPHY, R. D.
Application of Monte Carlo and Molecular Dynamics Methods to the Calculation of Thermodynamic Properties of Molten Salts.
AD-A148 897/2/GAR *515,491*

MURPHY, T. A.
Realistic Localizer Courses for Aircraft Instrument Landing Simulators.
N85-12885/8/GAR *514,531*

MURPHY, T. P.
Post-Processing of Bibliographic Citations from DOE/RECON, NASA/RECON, and DOD/DROLS. Revision 1.
DE85000617/GAR *514,443*

MURRAY, B.
Mars Polar Volatiles: Topographic and Geologic Setting.
N85-13708/1/GAR *514,395*

MURRAY, R. N.
Ethics and the Army Officer: An Assessment and Recommendations for the Future.
AD-A148 949/1/GAR *514,517*

MYERS, C.
Object-Oriented Signal Processing Environment: The Knowledge-Based Signal Processing Package.
AD-A148 963/2/GAR *514,809*

NAAB, K. N.
Effects of Side Impact Padding on Driver Performance.
PB85-136372/GAR *515,129*

NAGARAJA, K. S.
Flutter Parametric Studies of Cantilevered Twin-Engine-Transport Type Wing with and Without Winglet. Volume 1: Low-Speed Investigations.
N85-13269/4/GAR *514,339*

Flutter Parametric Studies of Cantilevered Twin-Engine Transport Type Wing with and Without Winglet. Volume 2: Transonic and Density Effect Investigations.
N85-13270/2/GAR *514,340*

NAGY, A.
Safety Assessment for the RF Test Facility.
DE84017063/GAR *515,310*

NANSTAD, R. K.
Direct Comparison of Unloading Compliance and Potential Drop Techniques in J-Integral Testing.
DE85001550/GAR *514,988*

Effect of Temperature on the Stress-Relaxation Response of a Pressure Vessel Steel.
NUREG/CR-3728/GAR *514,989*

NASSERSHARIF, B.
Interfacing Systems Loss-of-Coolant Accident in Oconee-1 Pressurized Water Reactor.
DE85000175/GAR *515,436*

NASTROM, G. D.
Equations and Algorithms for Meteorological Applications in Air Weather Service.
AD-A148 894/9/GAR *514,410*

NATHANSON, N.
Mechanisms of Bunyavirus Virulence: A Genetic Approach.
AD-A149 058/0/GAR *514,635*

NEBEKER, A. V.
Biological Methods for Determining Toxicity of Contaminated Freshwater Sediments to Invertebrates.
PB85-144103/GAR *514,672*

Effects of Copper, Nickel and Zinc on the Life Cycle of the Caddisfly 'Clistoronia magnifica' (Limnephilidae).
PB85-144111/GAR 514,573

NEGAS, T.
Process of Synthesizing Mixed BaO-TiO2 Based Powders for Ceramic Applications.
PAT-APPL-6-671 539/GAR 514,963

NEHRING, U.
Model Equations Describing Unsteady Fluid Motion.
N85-13194/4/GAR 515,533

NEILSON, R. H.
Some Addition and Complexation Reactions of a Silylated Amino(Methylene)Phosphine.
AD-A149 042/4/GAR 514,683

Synthesis of Some Highly Silylated Aminophosphines and Their Reactions with Carbon Tetrachloride.
AD-A149 066/3/GAR 514,684

NEITZEL, D. A.
Bivalve Fouling of Nuclear Power Plant Service-Water Systems. Volume 1. Correlation of Bivalve Biological Characteristics and Raw-Water System Design,
NUREG/CR-4070-V1/GAR 514,732

NELSEN, B. H.
Long Span Bridge Deflections.
PB85-138683/GAR 515,192

NELSON, B. E.
Design Description of the Vacuum Vessel for the Advanced Toroidal Facility.
DE85002561/GAR 515,332

NELSON, D. E.
Combat Battle Damage Assessor Expert System,
AD-A148 898/0/GAR 515,268

NELSON, W. J.
Structural Geology of Southeastern Illinois and Vicinity.
NUREG/CR-4036/GAR 514,744

NEMETH, M. P.
Buckling Analysis for Rectangular Orthotropic Plates with Centrally Located Cutouts.
N85-13268/6/GAR 515,578

NEMETH, Z. A.
Guidelines for Left-Turn Treatments at Signal Controlled Intersections.
PB85-144327/GAR 515,108

NERI, D. F.
Guidelines for the Use of Color in SUBACS (Submarine Advanced Combat System) A Displays.
AD-A148 924/4/GAR 514,504

Individual Differences in Chromatic Brightness Matching.
AD-A148 882/4/GAR 515,549

NETTLES, W. C.
Ovipositional Stimulant for Trichogramma Spp.
PATENT-4 484 539 514,602

NEUMANN, P. H.
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PB85-138246/GAR 514,536

NEWBY, R. A.
Particulate Emissions and Control in Fluidized-Bed Combustion: Modeling and Parametric Performance.
PB85-152973/GAR 515,114

NEWMAN, R. A.
Drinking Water Microbiology. NATO/CCMS (Committee on the Challenges of Modern Society) Drinking Water Pilot Project Series,
PB85-144343/GAR 515,109

NEY, E. J.
Solar Total Energy Project, Shenandoah, Georgia Site. Annual Technical Progress Report, July 1, 1983-June 30, 1984.
DE85001486/GAR 514,904

NGUYEN, D. H.
Modeling of Core Debris-Sodium-Concrete Interactions.
DE85000076/GAR 515,375

NICHOLSON, W. L.
Influence of Individual Reflections on the Precision of Parameter Estimates in Least Squares Refinement.
DE85000830/GAR 515,521

NIEDENZU, K.
Boron Derivatives of 3-Methylpyrazole.
AD-A148 980/6/GAR 514,682

Structures of Three Pyrazaboles: 1,3,5,7-Tetramethylpyrazabole; 4,4-Bis(pyrazol-1'-yl)pyrazabole; 4,4,8,8-Tetrakis(pyrazol-1'yl)pyrazabole.
AD-A148 995/4/GAR 514,687

NIEDENZU, P. M.
Boron Derivatives of 3-Methylpyrazole.
AD-A148 980/6/GAR 514,682

NIEDERLEHNER, B. R.
Effects of Cadmium on the Population Growth of a Benthic Invertebrate Aeolosoma Headleyi (Oligochaeta).
PB85-144079 514,671

NIELSON, K. K.
Predicting Long-Term Moisture Contents of Earthen Covers at Uranium Mill Tailings Sites.
DE85000777/GAR 515,392

NILSSON, S.
Digital Radio Link: Wave Propagation Measurements Using Narrow Band Technique.
N85-13152/2/GAR 515,291

NISBET, I. C. T.
Review and Evaluation of the Evidence for Cancer Associated with Air Pollution.
PB85-142016/GAR 514,670

NIX, R. G.
Hydrogen from Solar Energy.
DE85001914/GAR 515,633

NOBRE, P.
Fontes de Calor Nos Tropicos E Escoamentos Anoma Los de Larga Escala Associadas COM Anomalias de Precipitacao No Nordeste Do Brasil (Heat Sources in the Tropics and Large Scale Flow Anomalies Associated with Precipitation Anomalies in Northeast Brazil).
N85-13421/1/GAR 514,414

NOERSKOV, J. K.
Vibrational Excitation, Harpooning, and Sticking in Molecule-Surface Collisions.
PB85-151603 514,719

NOETH, H.
Structures of Three Pyrazaboles: 1,3,5,7-Tetramethylpyrazabole; 4,4-Bis(pyrazol-1'-yl)pyrazabole; 4,4,8,8-Tetrakis(pyrazol-1'yl)pyrazabole.
AD-A148 995/4/GAR 514,687

NORD, A. R.
Mini-Modal Testing of Wind Turbines Using Novel Excitation.
DE85000666/GAR 514,902

NORTHINGTON, D. J.
Standard Operating Procedures for Conducting Sampling and Sample Bank Audits,
PB85-143279/GAR 515,238

NOVAK, G.
Detection of Submillimeter Polarization in the Orion Nebula.
N85-13700/8/GAR 514,388

NOWAK, E. J.
Diffusion of Plutonium in Compacted, Brine-Saturated Bentonite.
DE85002440/GAR 515,413

NUNZIATO, J. W.
Thermal-Mechanical Model of Deflagration-to-Detonation in Granular Energetic Materials,
AD-P004 346/3/GAR 515,593

NYHAN, J. W.
Distribution of Radionuclides and Water in Bandelier Tuff Beneath a Former Los Alamos Liquid Waste Disposal Site after 33 Years.
DE85001406/GAR 515,402

O'BRIEN, D. E.
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AD-A149 035/8/GAR 514,664

O'CONNELL, P. E.
Water Quality Modelling, Forecasting and Control,
PB85-139434/GAR 515,095

O'GRADY, W. E.
Fuel Cell Reaction in Super Acid Electrolytes.
PB85-155976/GAR 514,726

O'HARA, F. M.
Sourcebook: Gaining Access to US Government Information on the Environment and Natural Resources.
DE84017419/GAR 514,442

O'HARA, L.
Sourcebook: Gaining Access to US Government Information on the Environment and Natural Resources.
DE84017419/GAR 514,442

O'KEEFE, M. A.
Electron Image Simulation: A Complementary Processing Technique.
DE85000685/GAR 515,520

O'KEEFFE, D. J.
Guidelines for Predicting the Effects of Underwater Explosions on Swimbladder Fish.
AD-A148 870/9/GAR 515,505

O'LOUGHLIN, J. M.
Generalized Multidemensional Propagation Velocity Equations for Pool-Boiling Superconducting Windings.
DE85000926/GAR 514,786

Vapor Cooled Lead and Stacks Thermal Performance and Design Analysis by Finite Difference Techniques.
DE85001038/GAR 515,319

OBENSHAIN, F. E.
Large Acceptance Spectrometers for pi exp 0 Mesons.
DE85002472/GAR 515,357

OERNHAGEN, H.
Experiments with Hydrox at 1.3 Mpa (13 ATM).
N85-13471/6/GAR 514,622

OESTMARK, H.
Laser for Determining the Ignition Conditions of a Pyrotechnic Mixture.
N85-13230/6/GAR 515,598

OHTSUKA, T.
Transistorized Inverter and Examples of Its Application,
PB85-149540/GAR 514,949

OLIKER, V.
New Methods for Numerical Solution of One Class of Strongly Nonlinear Partial Differential Equations with Applications in Hydrodynamics.
AD-A149 028/7/GAR 515,023

OLIVER, B. F.
Modeling for Ultrasonic Nondestructive Evaluation or Columnar Structures in Anisotropic Materials. Progress Report.
DE85000435/GAR 515,518

OLSEN, C. S.
Particulate and Gas Release from Light-Water-Reactor (LWR) Fuel Rods Stored in Inert and Dry Air Atmospheres.
NUREG/CR-4056/GAR 515,420

OLSON, W. E.
AirLand Battle Execution -- Some Implications of Deep Attack.
AD-A148 948/3/GAR 515,269

OLSON, W. S.
Restoration of Multichannel Microwave Radiometric Images.
N85-13527/5/GAR 514,830

OMA, K. H.
In Situ Vitrification Pilot-Scale Radioactive Test.
DE85002671/GAR 515,416

OSBORNE, M. F.
Iodine Sorption/Desorption from Low-Alloy Steel and Graphite. Draft.
DE85000966/GAR 515,477

OSOBA, J. S.
Enhanced Recovery of Oil from Subsurface Reservoirs with Carbon Dioxide. Final Report.
DE85000109/GAR 514,759

OSTWALD, R.
Investigation and Development of Multicolored Liquid Crystal Display Systems for Automotive Dashboard Application and Large Format Information Boards.
N85-13652/1/GAR 515,128

OTTINGER, C. A.
Coolability of UO sub 2 with Downward Heat Removal: The D10 Experiment.
DE84017007/GAR 515,374

OTTO, D.
Noise Emission of Technical Diffusion Flames in Dependence of Mixing Parameters, Burner Dimensions and Air Preheating for Fuel Gases with Different Flame Velocities.
DE84770498/GAR 515,595

OUSSET, Y.
Deformations Non-Lineaires et Flambage Statique Lineaire de Structures Soumises a des Forces de Pression (Nonlinear Deformation and Static Linear Buckling of Structures under Pressure).
N85-13261/9/GAR 515,581

OWEN, A. B.
Smoothing with Split Linear Fits,
AD-A149 032/5/GAR 515,024

OWENS, S. F.
Analysis of Physical-Chemical Processes Governing SSME Internal Fluid Flows.
N85-12859/3/GAR 515,696

OWENS, T. W.
Standard Operating Procedures for Conducting Sampling and Sample Bank Audits,
PB85-143279/GAR 515,238

PACE, J. V.
Sulfur Activation in Electric Pole Insulators in Hiroshima.
DE85001169/GAR 515,266

PAGE, T. L.
Bivalve Fouling of Nuclear Power Plant Service-Water Systems. Volume 1. Correlation of Bivalve Biological Characteristics and Raw-Water System Design,
NUREG/CR-4070-V1/GAR 514,732

PAINE, B. M.
Ion Beam Mixing: Basic Experiments.
DE85002763/GAR 515,560

PAINTER, T. R.
Multi-Pattern Low-Tension Demonstration Flood, Big Muddy Field. Technical Progress Report, July-September 1984.
DE85002157/GAR 514,761

PANAYOTOU, N. F.
Design and Use of Nonstandard Tensile Specimens for Irradiated Materials Testing.
DE85001071/GAR 514,987

PANCHAL, C. B.
Theoretical Analysis of Condensation in the Presence of Noncondensable Gases as Applied to Open Cycle OTEC Condensers.
DE84015809/GAR 514,879

KEYWORD INDEX

PANDOLF, K. B.
Skeletal Muscle Metabolism during Exercise is Influenced by Heat Acclimation,
AD-A148 845/1/GAR *514,658*

PANG, K. P.
Orientation of Hydroquinone and Benzoquinone Adsorbed on Platinum Electrodes: Studies by Reflection-Adsorption Infrared Spectroscopy.
AD-A149 011/9/GAR *514,688*

PANZIERI, F.
Communication System Supporting Large Datagrams on a Local Area Network.
PB85-139798/GAR *514,834*

Communications Protocols for Local Area Networks.
PB85-140564/GAR *514,835*

PAPANEK, G. F.
Labor Markets and Industry in Egypt: Analysis and Recommendations for Employment Oriented Growth,
PB85-136966/GAR *514,466*

PARFITT, G. D.
Program of Basic Research on the Preparation and Stability of Coal/Water Slurries. Quarterly Report.
DE85003172/GAR *514,766*

PARISI, B.
Co-Production of Gas and Water, Third Year.
PB85-156974/GAR *514,769*

PARKER, J. L.
Use of Calibration Standards and the Correction for Sample Self-Attenuation in gamma-Ray Nondestructive Assay.
DE85002347/GAR *515,339*

PARKINSON, W. H.
Absolute Transition Probabilities of Lines in the Spectra of Astrophysical Atoms, Molecules, and Ions.
N85-13705/7/GAR *514,393*

PARKS, C. V.
SCALE: A Modular Code System for Performing Standardized Computer Analyses for Licensing Evaluation - Additions and Revisions.
NUREG/CR-0200-REV 2/GAR *515,481*

PARMENTIER, T. J.
Definition of Technology Development Missions for Early Space Station Satellite Servicing. Volume 2. Technical.
N85-12923/7/GAR *515,708*

PARTHASARATHY, R.
Heavy Oil Processing Utilizing the Dynacracking Process. Final Report.
DE85000176/GAR *515,613*

PASHINSKI, D. J.
Tidal Phase Control of Sediment Discharge from the Yangtze River.
AD-A148 876/6/GAR *514,735*

PATCHING, C. A.
Long Term Durability of Urea Formaldehyde Glued Joints Removed from Vampire Aircraft.
AD-A149 053/1/GAR *514,332*

PATTEIN, J.
Plaques Polyurethannes pour Blindages Transparents (Polyurethane Plates for Transparent Blinding),
PB85-144525/GAR *515,510*

PATTON, J. F.
Assessment of Muscle Strength and Prediction of Lifting Capacity in U.S. Army Personnel,
AD-A148 846/9/GAR *514,659*

PATTON, R. J.
Ocean Services User Needs Assessment. Volume 1. Survey Results, Conclusions and Recommendations.
N85-13445/0/GAR *514,447*

PAULSON, A. E.
Impact of the AT and T (American Telephone and Telegraph) Divestiture on the Strategic Air Command.
AD-A148 957/4/GAR *515,281*

PAVEL, J. R.
Some Experiences of Testing Protocol Implementations,
PB85-136345/GAR *514,832*

PAVLIN, J.
Predicting the Performance of Distributed Knowledge-Based Systems: A Modeling Approach,
AD-A149 021/8/GAR *514,427*

PEARSON, R. A.
Toughening Mechanism in Elastomer-Modified Epoxy Resins, Part 2.
N85-13046/6/GAR *515,018*

PECK, S. D.
Vapor Cooled Lead and Stacks Thermal Performance and Design Analysis by Finite Difference Techniques.
DE85001036/GAR *515,319*

PEDERSEN, D. R.
Bubble-Induced Mixing of Two Horizontal Liquid Layers with Non-Uniform Gas Injection at the Bottom.
DE85000097/GAR *515,377*

Modeling of Core Debris-Sodium-Concrete Interactions.
DE85000076/GAR *515,375*

PEDERSON, B.
H8-1 and H8-2 Cataloging Handbooks.
PB85-120483/GAR *514,451*

PEDLOSKY, J.
On the Dynamics of the Coupled Mixed Layer-Thermocline System and the Determination of the Oceanic Surface Density.
AD-A148 968/1 *514,737*

PEGORARO, F.
Collective Effects in Spin Polarized Plasmas.
DE85002702/GAR *515,572*

PENA, D.
Robust Kalman Filtering and Its Applications.
AD-A149 044/0/GAR *515,025*

PENNER, T.
Private Sector and the Economic Development of Malawi.
PB85-140606/GAR *514,473*

PEPKE, E.
Economic Analysis of Three Methods to Dry Biomass Fuels.
DE85000178/GAR *515,614*

PEPPIN, R. J.
Acoustical Laboratory Accreditation Program of the United States.
PB85-151694 *515,517*

PERKINS, L. Z.
Dworshak Dam, North Fork Clearwater River, Idaho. Hydraulic Model Investigation.
AD-A148 864/2/GAR *515,079*

PERSHING, D. W.
Reducing Pollutant Emissions by Fines Removal.
PATENT-4 485 747 *515,090*

PERSOFF, P.
Steam Stripping of Oil Shale Wastewaters. LBL/SEEHRL Steam Stripper: Design, Operation, and Maintenance Manual.
DE85003058/GAR *515,089*

PERSSON, B. N. J.
High Resolution Electron Energy Loss Studies of Fermi-Level States of Clean and Metallized Si(111) Surfaces.
AD-A148 933/5/GAR *515,584*

PETERSEN, G.
Test Field Pollworm for Wind Turbines.
DE84752110/GAR *514,882*

PETERSON, C. R.
Internal Seal for Repairing Natural Gas Mains.
PB85-142685/GAR *514,957*

PETERSON, D. B.
Review of Solar Fuel-Producing Quantum Conversion Processes.
DE85000336/GAR *515,617*

Solar Photochemical Process Engineering for Production of Fuels and Chemicals.
DE85000335/GAR *515,616*

PETERSON, K.
Co-Production of Gas and Water, Third Year.
PB85-156974/GAR *514,769*

PETERSON, M. B.
Strategy for Selection of Tribological Coatings.
PB85-151686 *514,966*

PETERSON, T. W.
Aerosol Formation from Pulverized Coal Combustion. Quarterly Reports 1, 2 and 3.
DE85003188/GAR *515,667*

PETITDEMANGE, C.
L'Analyse de la Valeur (Value Analysis).
N85-13684/4/GAR *514,463*

L'Organisation de la Qualite (Quality Organization).
N85-13257/9/GAR *515,255*

PETOT, D.
Application of the Onera Model of Dynamic Stall.
N85-12862/7/GAR *514,318*

PETTIT, R. B.
Accelerated Aging of Aluminized Acrylic Solar Mirror Materials.
DE85002683/GAR *514,911*

PFEIFER, H. J.
Possibilites d'Application de l'Anemometrie Laser a l'Etude de l'Interaction Cho/Couche Limite en Transonique (Possibilities of Applying Laser Anemometry to an Investigation of the Interaction Shock/Boundary Layer in Transonic Flight),
PB85-144533/GAR *514,327*

PHILLIPS, W. P.
Space Shuttle Orbiter Trimmed Center-of-Gravity Extension Study. Volume 8: Effects of Configuration Modifications on the Aerodynamic Characteristics of the 140 a/B Orbiter at a Mach Number of 5.97.
N85-12867/6/GAR *515,712*

PIAT, J. F.
Precision des Essais de 1/2 Maquettes Motorisees a S2MA (Half Powered Model Tests in the Modane Center),
PB85-141703/GAR *514,326*

PICKFORD, R. D.
Drinking Water Microbiology. NATO/CCMS (Committee on the Challenges of Modern Society) Drinking Water Pilot Project Series,
PB85-144343/GAR *515,109*

PIERCE, R. D.
Advanced Fuel Cell Development. Progress Report, October-December 1983.
DE85000781/GAR *514,933*

PIGFORD, T. H.
Assessing the Performance of Geologic Repositories for Nuclear Waste.
DE85001197/GAR *515,399*

PIHOS, G. G.
Multisensor Satellite Data Integration for Sea Surface Wind Speed and Direction Determination.
N85-13446/8/GAR *514,770*

PILCHER, J. O.
Acceleration Measurements in High G Environments.
AD-A148 896/4/GAR *515,506*

PINCKERT, R. E.
Conference Proceedings of Operational Loads Data Held at Sienna, Italy on 2-6 April 1984,
AD-A149 025/9/GAR *514,329*

PINEL, S. I.
Effect of Two Inner-Ring Oil-Flow Distribution Schemes on the Operating Characteristics of a 35 Millimeter Bore Ball Bearing to 2.5 Million Dn.
N85-13233/0/GAR *515,165*

PINGREY, D. W.
Direct Combustion Systems to Produce Power from Biomass from Wood, Forest and Agricultural Crop Residue,
PB85-137800/GAR *515,670*

PIOTROWSKI, A.
Importance of Active Sites for Char Gasification in Oxygen (Air) and Carbon Dioxide.
PB85-155984/GAR *515,673*

PIPER, E.
Energieuebertraege bei Atom-Molekuel-Streuexperimenten AM Beispiel der Systeme SF6-AR, CF4-Ne und Xe-CO2 im I 1 Ev-Bereich (Energy Transfer in Atom-Molecule Scattering Experiments in the 1EV Region with SF6-AR, CF4-Ne and Xe-CO2 Systems as Examples).
N85-13588/7/GAR *514,708*

PITTINGER, C. A.
Effects of Cadmium on the Population Growth of a Benthic Invertebrate Aeolosoma Headleyi (Oligochaeta).
PB85-144079 *514,671*

PLASIL, F.
Large Acceptance Spectrometers for pi exp 0 Mesons.
DE85002472/GAR *515,357*

PLEASANT, L. G.
Space Medicine Research Publications: 1983-1984.
N85-13469/0/GAR *514,586*

POBGEE, P. J.
Automatic Analysis of Speckle Photographs by Microcomputer,
PB85-138378/GAR *515,235*

POESCHEL, R. L.
Ion Thruster System (8-cm) Cyclic Endurance Test.
N85-12937/7/GAR *515,603*

POLHAMUS, G. D.
Measurement and Prediction of Thermal Injury in the Retina of the Rhesus Monkey.
AD-A148 977/2/GAR *514,654*

PONG, M. C.
I-PIGS: A Concurrent Programming Environment with Interactive Graphical Support,
PB85-140846/GAR *514,836*

POOL, K. H.
Leak Detectors for Organic Rankine Cycle Power Plants: On-Line and Manual Methods.
DE85002792/GAR *514,943*

PORTMAN, D. J.
Program for Solar Energy Meteorological Research and Training, Region VI. Final Report.
DE85001483/GAR *514,412*

POST, E.
NO2 and Health Effects: Analysis of Selected Studies. Phase 2.
PB85-149714/GAR *514,674*

POTTER, J. L.
Role of Freestream Turbulence Scale in Subsonic Flow Separation.
N85-12870/0/GAR *514,322*

POUCHOT, W. D.
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DE85002156/GAR *514,938*

POZZORINI, R.
Vergleichende Stroemungsrechnung an Transsonischen Kegel/Zylinder-Eidhmodellen im Zusammenhang MIT Dem Wandinterferenzproblem (Comparative Flow Calculation on Transonic Cone/Cylinder Standard Models in Connection with the Wall Interference Problem).
N85-12878/3/GAR *515,218*

PRATT, R. G.
Private Sector: Costa Rica.
PB85-141679/GAR *514,479*

PRATT, S. T.
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PRESTON, E. M.
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QUINT, B. E.
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RADEBAUGH, R.
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RAIFAS, B. E.
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U.S.-Flag Crosstrading. Volume 2. U.S.-Flag Crosstrading Operations and U.S. Policy Options.
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RAMIREZ, V.
Study of the Cooperative Movement in Honduras,
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RANADIVE, A. Y.
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RANCE, N. E.
Modulation of the Cytosolic Androgen Receptor in Striated Muscle by Sex Steroids.
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RANKA, K.
Instrumented Impact Testing Machine with Reduced Specimen Oscillation Effects.
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RANKIN, R. A.
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RASHED, O.
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RASMUSSEN, O. R.
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RATCLIFFE, C. A.
Portable Microdosimetry System.
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RATIU, T.
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REDDY, G. N.
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REDER, S.
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REE, F.
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REED, D. W.
Review of British Flood Forecasting Practice,
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REED, S. T.
Sol-Gel-Derived AR Coatings for Solar Receivers.
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REEL, J. R.
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PB85-144798/GAR *514,673*

REEVE, J. N.
Mistranslation of the mRNA Encoding Bacteriophage T7 0.3 Protein.
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REEVES, M. E.
Artificial Photosynthesis with Algal and Reconstituted Systems.
DE85002557/GAR *515,660*

REGINATO, L. L.
Adaptation of an Air-Dielectric RF Cable for Use as an Oil-Filled High Voltage Pulse Transmission Line.
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REIDENAUER, J. A.
An Experimental Investigation of Enhanced Harpacticoid (Copepoda) Abundances Around Isolated Seagrass Shoots.
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REINMUTH, K.
Development and Fabrication of Refractory Bodies for Gas Turbine Engines.
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RENARDY, M.
Perturbation of a Multiple Eigenvalue in the Benard Problem for Two Fluid Layers.
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Recent Developments and Open Problems in the Mathematical Theory of Viscoelasticity.
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RENARDY, Y.
Perturbation of a Multiple Eigenvalue in the Benard Problem for Two Fluid Layers.
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RESNICK, S.
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REST, J.
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REST, K. M.
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REVSON, J. E.
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REXROTH, P. E.
Applications of the CONTAIN 1.0 Computer Code to the Analysis of Containment Loading under Severe Accident Conditions.
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Program Design for an Adaptive, Non-Linear Finite Element Solver.
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RICE, E. W.
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RICE, J. B.
Mistranslation of the mRNA Encoding Bacteriophage T7 0.3 Protein.
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RICE, R. F.
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RICHARDSON, E. G.
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RICKERT, P.
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DE84013462/GAR *515,386*

RINTAMAA, R.
Instrumented Impact Testing Machine with Reduced Specimen Oscillation Effects.
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International Comparative Study of Systems for the Government Advancement of Research and Development.
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RITTER, J. J.
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ROBBINS, C.
Design of Energy-Responsive Commercial Buildings.
DE84013046/GAR *515,062*

ROBBINS, F. W.
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Asymptotic Formulas for the Motion of Shaped Charge Liners.
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ROBINSON, C. V.
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ROGERSON, J. E.
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ROME, J. A.
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RONNINGEN, L. A.
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ROONEY, D.
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PB85-139665/GAR *515,001*

ROSA, R. A.
Study of the Cooperative Movement in Honduras,
PB85-133635/GAR *514,348*

ROSENBAUM, J. G.
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ROSENEAU, G.
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ROTH, R. S.
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PAT-APPL-6-671 539/GAR *514,963*

ROTHFELD, A. F.
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ROUGHAN, J. L.
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RUBIN, T. D.
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RUDDY, F. H.
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RUST, S.
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RYSSEL, H.
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RYZNAR, E.
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SACKINGER, P. A.
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SAHAR, G.
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SAKAJI, R. H.
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SALAMON, D.
Note on the Disturbance Decoupling Problem for Retarded Systems.
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SALAS, M. D.
Local Stability Analysis for a Planar Shock Wave.
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SALINGER, R.
Determining the Need for Training: A Collection of Federal Agency Needs Assessment Practices,
PB85-144806/GAR *514,538*

SALLAM, M. S.
Population Growth and Development in Egypt: Farmers' and Rural Development Officials' Perspectives,
PB85-141661/GAR *514,350*

SAMMELLS, A. F.
Solar-Assisted Hydrogen Generation by Photoelectrocatalysis.
PB85-149706/GAR *514,730*

Two Photoelectrode Solid-State Photoelectrochemical Cell,
AD-A148 982/2/GAR *514,686*

SAMMON, N. P.
High Resolution Computed Tomography for Solid Modeling and Computer Aided Design.
DE85000085/GAR *515,147*

SANDBORG, A.
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DE85002734/GAR *515,212*

SANDERSON, E. W.
Public Groundwater Supplies in Will County,
PB85-138550/GAR *514,753*

SAROHIA, V.
Experimental Investigation of Two-Dimensional Thrust Augmenting Ejectors, Part 1.
N85-12894/0/GAR *515,684*

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SAUERS, I.
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SAVONEN, C.
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SCHAEFER, W.
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SCHAFFAR, M.
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SCHIAVO-CAMPO, S.
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SCHIERMEIER, F. A.
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PB85-138584/GAR 515,091

SCHILLING, R.
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SCHLEPP, D.
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SCHLEPP, D. R.
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DE85000508/GAR 515,065

SCHMEISER, C.
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SCHMIDT, J. A.
Adaptation of an Air-Dielectric RF Cable for Use as an Oil-Filled High Voltage Pulse Transmission Line.
DE84017414/GAR 514,785

SCHMIDT, R. E.
Amphibian Chromomycosis.
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SCHMIDT, S. K.
Two Photoelectrode Solid-State Photoelectrochemical Cell,
AD-A148 982/2/GAR 514,686

SCHMIDT, T. R.
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SCHMIELE, R.
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PB85-143204/GAR 514,712

SCHMITZ, J. P.
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SCHNEIDER, B.
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SCHNEIDER, H. W.
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SCHNEIDERMAN, M. A.
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SCHNUPP, L.
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SCHOENWETTER, H. K.
Capacitive Sensors for Voltage Measurements in Pulse Power Systems.
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SCHOR, A. L.
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PB85-144236/GAR 515,469

SCHORNICK, H. M.
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SCHORR, M.
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SCHOTT, N. R.
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SCHRIER, E.
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SCHULLER, F. T.
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SCHULTZ, K. J.
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SCHULZ, P.
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SCOTT, W. A.
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SEDIN, Y. C. J.
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SEEBAUGH, W. R.
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SEGALL, S. B.
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SHANNON, D. W.
Leak Detectors for Organic Rankine Cycle Power Plants: On-Line and Manual Methods.
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Special Function Instruments for Binary Cycle Geothermal Power Plants.
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SHAPIRO, S.
Asbestos: Expedience, Exposure, and Human Experience,
HRP-0906074/0/GAR 514,617

SHAPLEIGH, A.
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SHARIR, M.
On the Piano Movers' Problem. V. The Case of a Rod Moving in Three-Dimensional Space Amidst Polyhedral Obstacles.
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SHARP, D. S.
Assessment of Muscle Strength and Prediction of Lifting Capacity in U.S. Army Personnel,
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SHEN, H. T.
Tidal Phase Control of Sediment Discharge from the Yangtze River.
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SHEN, Y. R.
Optical Second Harmonic Generation for Surface Studies.
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SHENKIR, C. A.
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SHEPHERD, K. P.
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SHERMAN, M. P.
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SHIEH, D. J.
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SHIN, K. C.
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SHIPLEY, S. T.
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SHIVELY, S. L.
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SHOPE, G. L.
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General Purpose Signal Conditioning.
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SIBBERS, C. W.
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SIEGEL, A. I.
Maintenance Personnel Performance Simulation (MAPPS) Model.
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SIGETY, P.
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SIGNER, H. R.
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SILLWOOD, J. M.
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SILVA, O. D.
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SIM, A. G.
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Food Aid and Development: The Impact and Effectiveness of Bilateral PL 480 Title 1-Type Assistance.
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SINGH, M. S.
Approaches to Ultrafast Neutron Detectors.
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SINGHAL, A. K.
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SKARET, E.
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Program Design for an Adaptive, Non-Linear Finite Element Solver.
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SMITH, P. L.
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SMITH, R. M.
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SONTAG, A.
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SOREL, M.
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AD-P004 398/8/GAR *515,274*

SPRAGUE, H. B.
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PB85-143089/GAR *514,374*

Soil Improvement, Rainfall Conservation, and Erosion Control in Developing Countries.
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SPRANGLE, P.
Free Electron Laser with a Rotating Quadrupole Wiggler.
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SPREITER, J. R.
Magnetohydrodynamic and Gasdynamic Theories for Planetary Bow Waves.
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SPRINGFIELD, B. W.
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Far-Infrared Line Emission from the Galaxy.
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PB85-139228/GAR *514,467*

STAEHLE, R. L.
Technologies for Space Station Autonomy.
N85-12906/2/GAR *515,713*

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Magnetohydrodynamic and Gasdynamic Theories for Planetary Bow Waves.
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PB85-144533/GAR *514,327*

STANGE, A.
Fluorescent Dyes for Luminescent Solar Concentrators.
N85-13061/5/GAR *514,919*

STANIUNAS, J. W.
Follow-On 40-kW Field Test Support.
PB85-151322/GAR *514,926*

STANSBURY, J. W.
Biocompatible Cementitious Dental Compositions.
PATENT-4 486 179 *514,956*

STEBBINGS, R. F.
Laboratory Studies of Atomic Collision Processes of Importance in Planetary Atmospheres.
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STEEL, E. B.
Mineralogical Characteristics of Asbestos.
PB85-143675 *514,750*

STEFAN, G.
Calculation through Fault Tree Analysis of the Probability of a Warhead Being Armed Prior to Launch,
AD-P004 339/8/GAR *515,274*

STEIN, J. P.
Children and Women in Traditional and Cash Crop Agriculture: A Preliminary Cross-Section Study of Economic Development in Guatemala,
PB85-143709/GAR *514,355*

STEINBERG, D. I.
Economic Development of Korea: Sui Generis or Generic.
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STEPHENS, J. R.
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STERNE, M.
Azores Earthquake Reconstruction, January 1, 1980: A Report after Two and One Half Years,
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STEWART, R. B.
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STILES, P. J.
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STOCKBAUER, R.
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STOCKLIN, K.
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STOL, N.
Modelling, Implementation and Use of a Traffic Simulator for NPDN (Nordic Public Data Network),
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STOLP, H. D.
Qualification of a Thick Film Hybrid.
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Development of a Prototype Wavevector-Frequency Spectral Analysis System.
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DE85002792/GAR *514,943*

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System Status Display Information.
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WEHUNT, E. J.
Soil Sampling Apparatus.
PAT-APPL-6-637 241/GAR *514,780*

WEINER, J. H.
Basic Research on Macromolecular Dynamics.
PB85-152833/GAR *515,015*

WEISCHEDEL, H. R.
Electromagnetic Inspection of Wire Ropes Using Sensor Arrays.
AD-A149 016/8/GAR *514,985*

WEISS, M.
Separating the Variances of Noise Components in the Global Positioning System.
PB85-151710 *515,306*

WEISS, W. C.
Adaptation of an Air-Dielectric RF Cable for Use as an Oil-Filled High Voltage Pulse Transmission Line.
DE84017414/GAR *514,785*

WELCH, A. J.
Measurement and Prediction of Thermal Injury in the Retina of the Rhesus Monkey.
AD-A148 977/2/GAR *514,654*

WENDT, J. O. L.
Coal Pyrolysis in Flat Opposed Jet Combustion Configurations. Interim Technical Progress Report, May 30, 1984-August 31, 1984.
DE85000351/GAR *515,618*

WERNER, L. H.
Evaluation of Birth Histories: A Case Study of Kenya.
PB85-141844/GAR *514,555*

WERNERS, B.
Efficient Algorithm for Fuzzy Linear Programming with Multiple Objectives.
AD-A149 012/7/GAR *515,051*

WERT, B. J.
Air Force Office of Scientific Research (AFOSR) Technical Report Summaries. Third Quarter (CY).
AD-A148 985/7/GAR *514,441*

WESSELS, B. W.
Solar-Assisted Hydrogen Generation by Photoelectrocatalysis.
PB85-149706/GAR *514,730*

WESTERFIELD, E. E.
Transdigitizer for Relaying Signals from Global Positioning System (GPS) Satellites.
PAT-APPL-6-666 784/GAR *515,305*

WESTERINK, J. J.
TEA: A Linear Frequency Domain Finite Element Model for Tidal Embayment Analysis.
PB85-142719/GAR *514,738*

WETZEL, J. R.
Automated Servo Controlled Calorimetry.
DE85002527/GAR *515,206*

WHATLEY, A.
Energy Data Report: Prices and Margins of No. 2 Distillate Fuel Oil. Monthly Report, December 1981.
DE85002294/GAR *515,648*

Energy Data Report: Prices and Margins of No. 2 Distillate Fuel Oil. Monthly Report, January 1982.
DE85002328/GAR *515,649*

Energy Data Report: Prices and Margins of No. 2 Distillate Fuel Oil. Monthly Report, November 1982.
DE85002279/GAR *515,641*

Energy Data Report: Prices and Margins of No. 2 Distillate Fuel Oil. Monthly Report, October 1982.
DE85002278/GAR *515,640*

WHEATER, J. F.
Deconfining Transitions in 2+ 1 Dimensional SU(3) and SU(4) Gauge Theories,
PB85-139764/GAR *515,575*

Scales of Deconfinement,
PB85-139772/GAR *515,567*

WHEATON, T. R.
Yaughan and Curriboo Plantations: Studies in Afro-American Archaeology.
AD-A148 985/5/GAR *514,508*

WHEELER, W. A.
Development, Use and Control of Maintenance Procedures in Nuclear Power Plants: Problems and Recommendations.
NUREG/CR-3817/GAR *515,365*

WHEELOCK, S. L.
Multisensor Satellite Data Integration for Sea Surface Wind Speed and Direction Determination.
N85-13446/8/GAR *514,770*

WHICKER, F. W.
Radioecological Investigations of Uranium Mill Tailings Systems. Fifth Technical Progress Report, October 1, 1983-September 30, 1984.
DE85000005/GAR *515,422*

WHITE, D. H.
Modified Extruder for Feeding Fine-Ground Cellulosic Slurries to Pressure Systems. Final Report, 1978-1980.
DE85001668/GAR *515,630*

WHITEHEAD, G. L.
MHD Performance Demonstration Experiment, FY 1974 to FY 1984. Final Report.
DE85000854/GAR *514,934*

WHITEHEAD, P. G.
Water Quality Modelling, Forecasting and Control,
PB85-139434/GAR *515,095*

WHITMORE, S. A.
Flight and Wind-Tunnel Comparisons of the Inlet-Airframe Interaction of the F-15 Airplane.
N85-12884/1/GAR *514,334*

WIBERLY, S. E.
Composite Structural Materials.
N85-12966/6/GAR *514,974*

WICHITA, J.
Process and Implementation Issues in the Design and Conduct of Programs to Aid the Reemployment of Dislocated Workers,
PB85-146702/GAR *514,539*

WICHNER, R. P.
Iodine Sorption/Desorption from Low-Alloy Steel and Graphite. Draft.
DE85000966/GAR *515,477*

WIEDER, H. H.
Surface and Interfacial Properties of Ga(0.47)In(0.53)As Alloys.
AD-A148 891/5/GAR *515,583*

WIEDWALD, J. D.
Approaches to Ultrafast Neutron Detectors.
DE85001206/GAR *515,347*

WIENCEK, T. C.
Differential Thermal Analysis Study of U sub 3 Si-Al and U sub 3 Si sub 2 -Al Reactions.
DE85002647/GAR *515,489*

WIKLANDER, D.
Stress Intensity Factors for Corner Cracks at Holes Located Near an Edge.
N85-13279/3/GAR *515,579*

WILEDEN, J. C.
A Debugging Tool for Distributed Systems.
AD-A148 916/0 *514,807*

WILEMSKI, G.
Experimental and Theoretical Study of Condensation in Multicomponent Vapors. Quarterly Report No. 1 for 15 February-14 May 1984.
DE85000857/GAR *514,696*

WILKING, B. A.
Far-Infrared Photometry of Compact Extragalactic Sources: OJ 187 and BL Lac.
N85-13701/6/GAR *514,389*

WILKINS, S. A.
Effect of Ventilation and Perfusion Imbalance on Inert Gas Rebreathing Variables.
PB85-144087 *514,650*

WILKOWSKI, G. M.
Degraded Piping Program. Phase 2. Semiannual Report, March 1984-September 1984.
NUREG/CR-4082-V1/GAR *515,459*

WILLIAMS, D. C.
Applications of the CONTAIN 1.0 Computer Code to the Analysis of Containment Loading under Severe Accident Conditions.
DE85002430/GAR *515,383*

WILLIAMS, G.
Achieving Aggressive Mitigation Through State Regulation: A Case of the Wyoming Industrial Development Information and Siting Act.
DE85000067/GAR *514,894*

WILLIAMS, J. D.
Recent Development in Pyrochemistry at Los Alamos.
DE85000174/GAR *515,388*

WILLIAMSON, D. F.
Design Description of the Vacuum Vessel for the Advanced Toroidal Facility.
DE85002561/GAR *515,332*

WILSON, J. H.
High-Temperature Gas-Cooled Reactor Safety Studies for the Division of Accident Evaluation Quarterly Progress Report, April 1-June 30, 1984,
NUREG/CR-3885-V2/GAR *515,456*

WILSON, W. S.
Effects of Impurities and Additives on the Growth of Polycrystalline TNT,
AD-A149 085/3/GAR *514,691*

WINBERRY, W. T.
Technical Assistance Document for Monitoring Sulfuric Acid Vapor from Stationary Sources,
PB85-143261/GAR *514,713*

WINGFIELD, M. E.
Expression of Lipopolysaccharide 0 Antigen in Escherichia coli K-12 Hybrids Containing Plasmid and Chromosomal Genes from Shigella dysenteriae 1.
AD-A148 942/6/GAR *514,580*

WINJE, D. K.
Disparities in Nuclear Power Plant Performance in the United States and the Federal Republic of Germany,
PB85-142735/GAR *515,467*

WINKLER, W.
Improved Sensitivities in Laser Interferometers for the Detection of Gravitational Waves.
N85-13232/2/GAR 515,574

WINN, C. B.
Research Priorities for Improving the Effectiveness of Active Solar Hot Water and Space Conditioning Systems.
PB85-153443/GAR 515,076

WINSHIP, C. T.
Hollow Ceramic Block: Containment of Water for Thermal Storage in Passive Solar Design. Final Technical Report.
DE85000217/GAR 514,952

WISE, C.
Qualitative Assessment of Selected Regional Training Institutions in West and Central Africa,
PB85-134716/GAR 514,535

WITCZAK, M. W.
Structural Design Guidelines for Heliports.
AD-A148 967/3/GAR 514,345

WOLF, D.
Modified Extruder for Feeding Fine-Ground Cellulosic Slurries to Pressure Systems. Final Report, 1978-1980.
DE85001688/GAR 515,630

WOLF, J. J.
Maintenance Personnel Performance Simulation (MAPPS) Model.
DE85002324/GAR 515,361

WOLF, M. A.
Use of a Commercial Ranging System in Field Surveys of Radioactively Contaminated Sites.
DE85002384/GAR 515,354

WOLF, R. E.
An Analysis of Creatine Phosphokinase in the Mucosa and the Muscularis of the Gastrointestinal Tract.
AD-A148 991/3/GAR 514,564

WOLFF, M.
Forschungsbericht 1979-1982. Teil 2: Projektteil (Research Report 1979-1982. Part 2: Projects).
N85-13667/9/GAR 514,534

WOLGIN, J. M.
Private Sector and the Economic Development of Malawi.
PB85-140606/GAR 514,473

Private Sector, the Public Sector, and Donor Assistance in Economic Development: An Interpretive Essay.
PB85-140093/GAR 514,469

WOLLER, D. M.
Public Groundwater Supplies in Will County,
PB85-138550/GAR 514,753

WOLLNIK, H.
Time-of-Flight Isochronous (TOFI) Spectrometer for Direct Mass Measurements of Exotic Light Nuclei.
DE85002050/GAR 515,352

WOO, H. H.
Engineering Research Progress Report, October 1983-March 1984.
DE85000165/GAR 515,086

WOOD, D. H.
Squamous Cell Carcinoma with Metastasis in a Rhesus Monkey (Macaca mulatta).
AD-A148 869/1/GAR 514,578

Technology and Management Needs of Small and Medium Agro-Industrial Enterprises in Kenya: Implications for an International Agro-Industrial Service Center,
PB85-143071/GAR 514,354

WOOD, M. H.
PFR/TREAT Program: Objectives, Accomplishments, and Plans.
DE84014751/GAR 515,472

WOOD, T. S.
Simple Assessment Techniques for Soil and Water,
PB85-142669/GAR 514,781

WOODRUFF, R. W.
RCSLK9: Reactor Coolant System Leak Rate Determination for PWRs (Pressurized Water Reactors). User's Guide.
NUREG-1107/GAR 515,465

WOODS, W. J.
Comparison of L04, L05, and L07: Three Irradiated 7-Pin Bundle TUCOP Tests.
DE84014680/GAR 515,471

PFR/TREAT Program: Objectives, Accomplishments, and Plans.
DE84014751/GAR 515,472

WOODWARD, J.
Artificial Photosynthesis with Algal and Reconstituted Systems.
DE85002557/GAR 515,660

WORLEY, B. A.
Flux Synthesis for the on-Line Surveillance of Nuclear Power Plants.
DE85000926/GAR 515,485

WORTH, G. M.
Use of a Commercial Ranging System in Field Surveys of Radioactively Contaminated Sites.
DE85002384/GAR 515,354

WOUTERS, J. M.
Time-of-Flight Isochronous (TOFI) Spectrometer for Direct Mass Measurements of Exotic Light Nuclei.
DE85002050/GAR 515,352

WRIGHT, A. E.
Comparison of L04, L05, and L07: Three Irradiated 7-Pin Bundle TUCOP Tests.
DE84014680/GAR 515,471

WRIGHT, J. E.
Assessment of Muscle Strength and Prediction of Lifting Capacity in U.S. Army Personnel,
AD-A148 846/9/GAR 514,659

WRIGHT, S. A.
Fuel Disruption Mechanisms Determined In-Pile in the ACRR (Annular Core Research Reactor).
NUREG/CR-3780/GAR 515,482

WRIGLEY, R. C.
Investigation of Several Aspects of LANDSAT 4/5 Data Quality.
N85-13357/7/GAR 514,823

WU, J. M.
Aerodynamic Improvements by Discrete Wing Tip Jets.
AD-A148 981/4/GAR 514,314

WU, W. T.
Interactions Between Corrosion and Creep of Uncoated and Coated Superalloys in Sulfate Melts.
N85-13038/3/GAR 514,995

WYLIE, A. G.
Mineralogical Characteristics of Asbestos.
PB85-143675 514,750

XIE, Q.
Transfer of Particulate Organic Carbon and Nitrogen from the Yangtze River to the Ocean.
AD-A148 931/9/GAR 514,752

XIE, Z. N.
Ovipositional Stimulant for Trichogramma Spp.
PATENT-4 484 539 514,602

XUELIANG, L.
Piezoelectric Stress Transducer Used for Measurements of Explosions in Hard Rock.
DE85000300/GAR 515,509

YAMAMOTO, K.
Experimental Investigation of Shock-Cell Noise Reduction for Dual-Stream Nozzles in Simulated Flight.
N85-13549/9/GAR 515,687

Experimental Investigation of Shock-Cell Noise Reduction for Single Stream Nozzles in Simulated Flight.
N85-13550/7/GAR 515,688

YAMANO, L. C.
Bistatic Coherent Radar Receiving System.
PAT-APPL-6-666 841/GAR 515,308

YANG, Z.
Transfer of Particulate Organic Carbon and Nitrogen from the Yangtze River to the Ocean.
AD-A148 931/9/GAR 514,752

YARN, J.
Maps Depicting Nonattainment Areas Pursuant to Section 107 of the Clean Air Act - 1984,
PB85-140630/GAR 515,097

YEE, A. F.
Toughening Mechanism in Elastomer-Modified Epoxy Resins, Part 2.
N85-13046/6/GAR 515,018

YEE, K. W.
Rotating Tool Wear Monitoring Apparatus.
PATENT-4 471 444 515,169

Use of Drill-Up for On-Line Determination of Drill Wear.
PB85-144988 515,245

YEH, C. L.
Noise Removal in Multichannel Images.
N85-13526/7/GAR 514,829

Restoration of Multichannel Microwave Radiometric Images.
N85-13527/5/GAR 514,830

YOSHINO, K.
Absolute Transition Probabilities of Lines in the Spectra of Astrophysical Atoms, Molecules, and Ions.
N85-13705/7/GAR 514,393

YOUNG, A. J.
Skeletal Muscle Metabolism during Exercise is Influenced by Heat Acclimation,
AD-A148 845/1/GAR 514,658

YOUNG, G. R.
Large Acceptance Spectrometers for pi exp 0 Mesons.
DE85002472/GAR 515,357

YOUNG, J. K.
Opportunities for Energy Conservation Through Biotechnology.
DE85002660/GAR 515,661

YOUNG, J. S.
Bivalve Fouling of Nuclear Power Plant Service-Water Systems. Volume 1. Correlation of Bivalve Biological Characteristics and Raw-Water System Design,
NUREG/CR-4070-V1/GAR 514,732

YOUNT, J. A.
Conceptual Design Report for a Remotely Operated Cask Handling System. Revision 1.
DE85001194/GAR 515,380

YUNKER, G. W.
Statistical Analysis of Helicopter Pilot Performance during Instrument Flight Across Repeated Flights.
AD-A148 903/8/GAR 514,514

ZABELL, S. L.
W.E. Johnson's 'Sufficientness' Postulate.
AD-A149 014/3/GAR 515,022

ZAGORSKI, H. J.
Training Objectives for Tank Platoon Leaders: A Focus Group Evaluation.
AD-A148 910/3/GAR 514,543

ZAGORSKI, Z. P.
Thermal Effects in Radiation Processing.
DE85002638/GAR 514,729

ZAININGER, H. W.
Electromagnetic Pulse (EMP) Interaction with Electric Power Systems. Power Systems Technology Program. Final Report.
DE85000166/GAR 515,343

ZALUZEC, N. J.
Calculation of Si(Li) X-Ray Detector Efficiencies.
DE85002732/GAR 515,211

Comparison of XEDS and EELS Using Conventional Beryllium Window and Windowless Detectors.
DE85002734/GAR 515,212

ZANG, L.
Long-Range Predictive Control Using Weighting-Sequence Models.
N85-13521/8/GAR 515,039

ZANGER, M.
Fiber Optic Data Bus Using Frequency Division Multiplexing (FDM) (Frequency Division Multiplexing) and an Asymmetric Coupler.
N85-13139/9/GAR 515,284

ZANK, N. S.
Financial Leverage Potential of Local Currency Proceeds Generated from the Food for Peace Program to Stimulate Private Enterprise in Developing Countries,
PB85-143097/GAR 514,481

ZANNELLI, D.
Guidelines for the Use of Color in SUBACS (Submarine Advanced Combat System) A Displays.
AD-A148 924/4/GAR 514,504

ZHANG, N.
Local Slot Boundary Condition for Transonic Flow Calculations in Slotted-Wall Test Sections of Wind Tunnels.
N85-12879/1/GAR 515,219

ZHAO, G.
Chinese Journal of Infrared Research (Selected Articles)--Translation.
AD-A149 059/8/GAR 515,199

ZHOU, M.
Measurement of Local Heat Flux Density and Local Ion Saturation Current Density in a Plasma Jet--Translation.
AD-A149 060/6/GAR 515,570

ZIEGLER, N. F.
Status Report on the ORNL (Oak Ridge National Laboratory) 25 URC Accelerator.
DE85002498/GAR 515,554

ZIEPLER, G.
Structural Changes During Milling of Aluminum Oxide Powders.
N85-13008/6/GAR 514,959

ZILLESSEN, C.
Technical Equipment for Rescuing Injured Miners in Case of Roof Breaks in Coal Faces and Roadways.
DE84752107/GAR 514,757

ZIMMERLE, J.
Reliability, Availability, and Maintainability of the Heat Recovery Incinerator at Naval Air Station , Jacksonville.
AD-A148 884/0/GAR 515,057

ZIMMERMAN, D. C.
Data Base Development for Ship Readiness Analyses.
AD-A149 036/6/GAR 514,814

ZIMMERMANN, H. J.
Efficient Algorithm for Fuzzy Linear Programming with Multiple Objectives.
AD-A149 012/7/GAR 515,051

ZION, P. M.
Coastal Zone Color Scanner (CZCS): Imagery of Near-Surface Phytoplankton Pigment Concentrations from the First Coastal Ocean Dynamics Experiment (CODE-1), March - July 1981.
N85-13447/6/GAR 514,733

ZOLLINGER, W. D.
Monoclonal Antibodies to Serotype 2 and Serotype 15 Outer Membrane Proteins of Neisseria meningitidis and Their Use in Serotyping.

AD-A148 970/7/GAR *514,581*

ZURFLUH, G.

Un Systeme de Documentation Electronique (An Electronic Documentation System).
N85-13683/6/GAR *514,449*

ZWEIFEL, P. F.

Applied Mathematics of Transport Theory. Progress Report, December 1, 1983-November 30, 1984.
DE85000848/GAR *515,037*

ZYSNO, P.

Efficient Algorithm for Fuzzy Linear Programming with Multiple Objectives.
AD-A148 012/7/GAR *515,051*

PERSONAL AUTHOR INDEX

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This index is arranged by personal author's last name followed by either a first name or an initial. NASA and DoE reports do not spell out an author's first name, but use only initials. As many as five authors may be included for each citation; all are listed in this index.

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SAMPLE ENTRY

ABARBANEL, H. D. I.
Richardson Number Criterion for the Nonlinear Stability of Three-Dimensional Stratified Flow.
AD-A148 971/5/GAR *515,528*

ABBOTT, L. W.
Test Experience on an Ultrareliable Computer Communication Network.
N85-13514/3/GAR *514,827*

ABBOTT, M. R.
Coastal Zone Color Scanner (CZCS): Imagery of Near-Surface Phytoplankton Pigment Concentrations from the First Coastal Ocean Dynamics Experiment (CODE-1), March - July 1981.
N85-13447/6/GAR *514,733*

ABEDIN-ZADEH, R.
Universal Fast Breeder Reactor Subassembly Counter Manual.
DE85001523/GAR *515,349*

ABEELE, W. V.
Distribution of Radionuclides and Water in Bandelier Tuff Beneath a Former Los Alamos Liquid Waste Disposal Site after 33 Years.
DE85001406/GAR *515,402*

ABERNATHY, J. R.
Tendencias Recentes na Metodologia de Levantamentos Demograficos em Paises em Desenvolvimento (Recent Methodological Trends in Demographic Investigation in Developing Countries),
PB85-140119/GAR *514,551*

ABRAMS, R.
Pigeonpeas (Cajanus cajan Millisp.): A Valuable Crop of the Tropics.
PB85-143105/GAR *514,375*

ACERO, L.
Technical Change in a Newly Industrializing Country: A Case Study of the Impacts on Employment and Skills in the Brazilian Textiles Industry.
PB85-143733/GAR *514,537*

ADAMCZYK, C.
Private Sector: Costa Rica.
PB85-141679/GAR *514,479*

ADAMS, D. M.
Interim Criteria for the Use of Programmable Digital Devices in Safety and Control Systems.
NUREG/CR-4017/GAR *515,458*

ADAMS, D. W.
Effects of Low Interest Rates on the Poor in Low Income Countries,
PB85-143014/GAR *514,353*

Rural Financial Markets and Income Distribution in Low Income Countries, Excerpt from Savings and Development,
PB85-134740/GAR *514,347*

ADAMS, E. E.
Eulerian-Lagrangian Analysis of Pollutant Transport in Shallow Water.
PB85-144269/GAR *515,107*

TEA: A Linear Frequency Domain Finite Element Model for Tidal Embayment Analysis.
PB85-142719/GAR *514,738*

ADAMS, J. W.
Evaluation of the Effects of Gamma Irradiation on the Mechanical Properties of High Density Polyethylene,
NUREG/CR-3898/GAR *515,012*

ADAMS, R. E.
Aerosol Release and Transport Program Semiannual Progress Report for April 1984-September 1984,
NUREG/CR-3830-V2/GAR *515,424*

ADEKUGBE, O. A.
Loop Simulation Capability for Sodium-Cooled Systems.
PB85-144236/GAR *515,469*

ADIBHATLA, S.
Design Report on the Atmospheric Fluidized Bed Combustor at the Kentucky Center for Energy Research Laboratory,
PB85-138915/GAR *515,092*

ADLAKHA, A. L.
Tendencias Recentes na Metodologia de Levantamentos Demograficos em Paises em Desenvolvimento (Recent Methodological Trends in Demographic Investigation in Developing Countries),
PB85-140119/GAR *514,551*

ADLER, L.
Modeling for Ultrasonic Nondestructive Evaluation or Columnar Structures in Anisotropic Materials. Progress Report.
DE85000435/GAR *515,518*

AFFOLTER, H.
Extrapolation of Engine Inlet Measurements According to Tsukahira,
PB85-143212/GAR *515,690*

AGARWALA, R.
Distorsions des Prix et Croissance dans les Pays en Developpement (Price Distortions and Growth in Developing Countries),
PB85-141638/GAR *514,478*

Price Distortions and Growth in Developing Countries.
PB85-141620/GAR *514,477*

AGRELL, N.
Local Slot Boundary Condition for Transonic Flow Calculations in Slotted-Wall Test Sections of Wind Tunnels.
N85-12879/1/GAR *515,219*

AHMAD, J.
Degraded Piping Program. Phase 2. Semiannual Report, March 1984-September 1984.
NUREG/CR-4082-V1/GAR *515,459*

AHRENS, T. J.
Particle Velocity Experiments in Anorthosite and Gabbro.
N85-13407/0/GAR *514,747*

AITCHISON, I. J. R.
Derivative Expansions of Fermion Determinants: Anomaly-Induced Vertices, Goldstone-Wilczek Currents, and Skyrme Terms,
PB85-139756/GAR *515,566*

ALBUS, J. S.
Language Independent Superstructure for Implementing Real-Time Control Systems.
PB85-151801 *514,840*

ALEXANDER, D. R.
Air-Land Battle Interdiction Model Corps Communications Module.
AD-A148 853/5/GAR *515,280*

ALFERNESS, P. L.
Environmental Fate Studies of HMX Screening Studies. Phase 1.
AD-A148 978/0/GAR *515,493*

PERSONAL AUTHOR INDEX

ALIAGA, D.
Perfectionnement des Lois de Fissuration par Fatigue sous Chargement Complexe (Perfecting the Fatigue Cracking Laws under Complex Loads).
PB85-145068/GAR *515,006*

ALLAN, D. W.
Separating the Variances of Noise Components in the Global Positioning System.
PB85-151710 *515,306*

ALLARD, R.
Dynamic Decision Making.
N85-13668/7/GAR *515,055*

ALLEN, B. R.
Ethanol from Sugar Crops: A Critical Review.
PB85-140176/GAR *515,671*

ALLEN, L. B.
High-Temperature Optically Activated GaAs Power Switching for Aircraft Digital Electronic Control.
N85-12901/3/GAR *514,337*

ALLEN, M. B.
Private Sector: Ideas and Opportunities. A Review of Basic Concepts and Selected Experience.
PB85-136331/GAR *514,464*

ALLEN, R. D.
Underground Pumped Hydroelectric Storage.
DE85000288/GAR *514,953*

ALLISON, S. W.
Applications of Pulsed-Laser Techniques and Thermographic Phosphors to Dynamic Thermometry of Rotating Surfaces.
DE85000403/GAR *515,202*

ALLURED, V. S.
Crystallization of the Protective Antigen Protein of Bacillus anthracis.
AD-A148 936/4/GAR *514,634*

ALM, A.
Official Journey to USA, November 1983. Symposium on the Compatibility of Explosives; Mound Laboratory; Naval Surface Weapons Center.
N85-13072/2/GAR *515,500*

ALMAND, B. J.
Evaluation of Automated Decisionmaking Methodologies and Development of an Integrated Robotic System Simulation.
N85-13516/8/GAR *514,828*

ALTEKAR, V. A.
Recovery and Recycling of Tin in Tinplate Plant.
PB85-145084/GAR *515,007*

ALTER, H.
PFR/TREAT Program: Objectives, Accomplishments, and Plans.
DE84014751/GAR *515,472*

ALZHEIMER, J. M.
Pipe-to-Pipe Impact Program.
DE84013162/GAR *515,429*

AMBO, T.
Translatorized Inverter and Examples of Its Application.
PB85-149540/GAR *514,949*

AMMERMAN,
Sector Suite Man/Machine Functional Capabilities and Performance Requirements.
AD-A148 881/6/GAR *514,803*

ANANDALINGAM, G.
Modeling Tax Credit Incentives for Business Investment in Selected Energy Conservation and Production Technologies.
DE85003168/GAR *514,918*

ANDERSON, J. L.
Toroidal Fusion Core Experiment (TFCX) Studies.
DE84016813/GAR *515,309*

ANDERSON, R. F.
Field Experiment Determinations of Distribution Coefficients of Actinide Elements in Saltate Lake Environments.
NUREG/CR-4094/GAR *515,341*

ANDERSON, R. R.
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BRANDT, B.
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BREWER, D. A.
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BRIEGEL, J.
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BROOKS, J. N.
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BROPHY, J. R.
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BROWN, A.
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BROWN, R. D.
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BROWN, S. P. A.
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BROWN, W. F.
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BROWNING, J. S.
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BRUCE,
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BRUEGMANN, J.
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BRYAN, J. B.
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BUCHANAN, R. C.
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BURNS, R. S.
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BUROLLA, V. P.
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BUTZ, W. P.
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CADWELL, J. J.
Education and Training Plan for the US DOE Office of Classification.
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CAFFERATA, G. L.
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CAFFERTY, P. J.
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CAIN, B.
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CAIN, M.
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CAMM, F.
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CARDENUTO, H. C.
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CAREY, K. L.
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CARNE, T. G.
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CARROLL, J. J.
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Atomic Structure and Optical Constants of (001) Tantalum.
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CARTER, R. J.
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CASASSA, E. Z.
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CASE, L. M.
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CATES, M. R.
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CEBE, P.
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CEYER, S. T.
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CHAPPERT, J.
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CHARLOT, L. A.
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Modeling of Core Debris-Sodium-Concrete Interactions.
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CHIARIZIA, R.
Actinide Separations by Supported Liquid Membranes.
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CHILDS, K. W.
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CHILDS, P. W.
Investigation of Factors Influencing Infrared Roof Moisture Surveys Using a Mathematical Model.
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CHILMAN, C. S.
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CHIN, R. T.
Noise Removal in Multichannel Images.
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Restoration of Multichannel Microwave Radiometric Images.
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CHING, J. K. S.
Cumulus Cloud Venting of Mixed Layer Ozone,
PB85-144137/GAR *514,408*

Observational Study of Transport in the Free Troposphere,
PB85-144145/GAR *515,104*

CHIPLEY, K. K.
Design Description of the Vacuum Vessel for the Advanced Toroidal Facility.
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CHOI, H. K.
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CHOU, T. W.
Environmental Fate Studies of HMX Screening Studies. Phase 1.
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CHOW, L. S. H.
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CHRISMENT, C.
Un Systeme de Documentation Electronique (An Electronic Documentation System).
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CHRISTENSEN, E. H.
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Magnet Cold Mass High Load Supports Thermal Response and Performance Design Correlation.
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CHRISTOPHOROU, L. G.
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CHUDNOFF, M.
Tropical Timbers of the World,
PB85-156917/GAR 514,381

CHUNG, K. S.
Fuel and Control Rod Failure Behavior During Degraded Core Accidents.
DE84014535/GAR 515,430

CHYNOWETH, D. P.
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Biogasification of Walt Disney World Biomass Waste Blend.
PB85-156958/GAR 515,674

Biological Gasification of Renewable Resources.
PB85-156966/GAR 515,675

CILIBERTI, D. F.
Particulate Emissions and Control in Fluidized-Bed Combustion: Modeling and Parametric Performance.
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CLAAR, T. D.
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CLAPP-WINCEK, C.
Private Sector and the Economic Development of Malawi.
PB85-140606/GAR 514,473

CLARK, C. G.
Defending the Frontier: A Study of the U.S. Army in the Defense of the Nebraska Frontier in the Years 1849-1853.
AD-A149 067/1/GAR 515,272

CLARK, R. N.
Ice-Soil Mixtures: Visual and Near-Infrared Remote Sensing Techniques.
N85-13358/5/GAR 514,775

CLARK, R. W.
Hydrodynamic Response of a Radiating Al Plasma Excited by a Proton Beam.
AD-A148 904/6/GAR 515,568

CLARKE, A. P.
Measurement of the Depth of a Sonar Array.
AD-A149 056/4/GAR 515,279

CLARKE, D. W.
Long-Range Predictive Control Using Weighting-Sequence Models.
N85-13521/8/GAR 515,039

Self-Tuning Control of Offset: A Unified Approach.
N85-13520/0/GAR 515,038

CLAY, E. J.
Food Aid and Development: The Impact and Effectiveness of Bilateral PL 480 Title 1-Type Assistance.
PB85-140572/GAR 514,553

CLAYTON, A. B.
Drinking and Driving Habits, Attitudes, and Behaviour of Male Motorists.
PB85-138436/GAR 514,548

CLEMENTE, F. A.
Low Level Radioactive Waste Disposal Siting: A Social and Technical Plan for Pennsylvania. Volume 1. An Overview of Options and Alternatives.
DE85002332/GAR 515,407

Low Level Radioactive Waste Disposal Siting: A Social and Technical Plan for Pennsylvania. Volume 2. Socioeconomic Analyses.
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CLEVELAND, J. C.
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CLINGMAN, W. H.
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CLIVER, D. O.
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PB85-144343/GAR 515,109

CLUZEL, B.
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COFFEY, H. E.
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COFFMAN, W. R.
Mejoramiento de Arroz (Rice Improvement),
PB85-143113/GAR 514,376

COHEN, M. S.
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NUREG/CR-3926-V1/GAR 515,483

COHN, L. F.
Environmental Aspects of Transportation,
PB85-145134/GAR 515,111

COLLINS, G. M.
Measurement of the Depth of a Sonar Array.
AD-A149 056/4/GAR 515,279

COLLINS, R. F.
Soviet Mid-Term Objectives, Strategies, and Prospects in Sub-Saharan Africa.
AD-A148 941/8/GAR 514,495

COLLOBER, J.
Bruit des Petits Groupes Moto-Compresseurs Mobiles. Experimentation de Plusieurs Traitements Acoustiques de Cout Limite et Permettant des Gains Progressifs (Noise in Small Portable Motocompressors. Experiments on Limited-Cost Acoustic Treatments to Obtain Progressive Improvements).
N85-13557/2/GAR 515,694

COMBI, M. R.
Outer Satellite Atmospheres: Their Nature and Planetary Interactions.
N85-13759/4/GAR 514,398

COMBS, L. P.
Safety Aspects of Prepackaged Liquid Propellant Stages for Strategic Missiles,
AD-P004 350/5/GAR 515,702

CONNELLY, H.
Monoclonal Antibodies to Serotype 2 and Serotype 15 Outer Membrane Proteins of Neisseria meningitidis and Their Use in Serotyping.
AD-A148 970/7/GAR 514,581

CONNOLLY, J. F.
OPMS (Officer Personnel Management System) Mini-Review.
AD-A149 020/0/GAR 514,522

CONNOR, J. J.
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PB85-142719/GAR 514,738

CONRAD, J. R.
Biological Gasification of Renewable Resources.
PB85-156966/GAR 515,675

COOK, R. L.
Solar-Assisted Hydrogen Generation by Photoelectrocatalysis.
PB85-149706/GAR 514,730

COOP, K. L.
Application of Wald's Sequential Probability Ratio Test to Nuclear Materials Control.
DE85002017/GAR 515,479

Monte Carlo Simulation of the Sequential Probability Ratio Test for Radiation Monitoring.
DE85002409/GAR 515,355

COOPER, S.
Modifications to FURDEC (Furnace Heat Transfer Program) to Include Self-Consistent Flame Modelling,
PB85-143154/GAR 515,075

COOPER, S. A.
Internal Seal for Repairing Natural Gas Mains.
PB85-142685/GAR 514,957

COPENHAVER, E. D.
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COPP, R. L.
Adaptation of an Air-Dielectric RF Cable for Use as an Oil-Filled High Voltage Pulse Transmission Line.
DE84017414/GAR 514,785

COPPI, B.
Collective Effects in Spin Polarized Plasmas.
DE85002702/GAR 515,572

CORDES, D. A.
Primer of Occupational and Environmental Medicine: A Manual for Family Physicians and Other Primary Care Physicians,
HRP-0906070/8/GAR 514,616

CORDES, D. H.
Physician Evaluation of Impairment/Disability.
HRP-0906093/0/GAR 514,619

CORKILL, D. D.
Coordination in a Distributed Problem Solving Network,
AD-A148 925/1/GAR 514,425

Distributed Vehicle Monitoring Testbed: A Tool for Investigating Distributed Problem Solving Networks,
AD-A148 917/8/GAR 514,424

Distributing a Distributed Problem Solving Network Simulator,
AD-A149 065/5/GAR 514,816

Functionally Accurate, Cooperative Distributed Systems.
AD-A148 926/9 514,808

Use of Meta-Level Control for Coordination in a Distributed Problem Solving Network,
AD-A148 915/2/GAR 514,423

CORLAY, B.
Bruit des Petits Groupes Moto-Compresseurs Mobiles. Experimentation de Plusieurs Traitements Acoustiques de Cout Limite et Permettant des Gains Progressifs (Noise in Small Portable Motocompressors. Experiments on Limited-Cost Acoustic Treatments to Obtain Progressive Improvements).
N85-13557/2/GAR 515,694

CORPENO, R.
Private Sector Evaluation: The Dominican Republic.
PB85-140135/GAR 514,470

CORSON, W.
Process and Implementation Issues in the Design and Conduct of Programs to Aid the Reemployment of Dislocated Workers,
PB85-146702/GAR 514,539

COSSIO, V.
Prevalencia de Bocio Endemico en la Poblacion escolar de Bolivia (Prevalence of Endemic Goiter in the School Population of Bolivia),
PB85-137925/GAR 514,505

COSTA, M. H. M.
Limitantes DA Equivocacao Em Canais Gaussianos Aditivos (Equivocation Limits in Gaussian Additive Channels).
N85-13137/3/GAR 514,858

COSTELLO, D. J.
Undetected Error Probability for Shortened Hamming Codes.
N85-13535/8/GAR 514,860

COUDRAY, P.
Surveillance des Machines (The Monitoring of Machines).
N85-13253/8/GAR 515,167

COUDURIER, J. F.
Conduite d'Une Cellule Flexible d'Usinage (Design of a Flexible Machining System).
N85-13252/0/GAR 515,152

COURVILLE, G. E.
Investigation of Factors Influencing Infrared Roof Moisture Surveys Using a Mathematical Model.
DE85002300/GAR 515,121

COWAN, C. E.
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COWKING, C. B.
PFR/TREAT Program: Objectives, Accomplishments, and Plans.
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PERSONAL AUTHOR INDEX

COWLEY, S.
Collective Effects in Spin Polarized Plasmas.
DE85002702/GAR *515,572*

COX, N. D.
BURYIT/ANALYZ: A Computer Package for Assessment of Radiological Risk of Low-Level Radioactive Waste Land Disposal. User's Manual,
NUREG/CR-3994/GAR *515,425*

COX, S. F. J.
Dynamical Studies Using Muons,
PB85-138733/GAR *515,585*

CRABO, B. G.
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PB85-141836/GAR *514,372*

CRAIG, L. J.
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DE85000599/GAR *515,314*

CRAIG, R. R.
Mixing, Chemical Reaction and Flow Field Development in Ducted Rockets.
DE85002710/GAR *515,597*

CRAINE, R. E.
Shape of the Fusion Boundary in an Electromagnetically Stirred Weld Pool,
PB85-138774/GAR *515,154*

CRAMER, E. R.
FFTF Fuel Assembly Outlet Temperature Measurements and Comparison to Predictions.
DE85001215/GAR *515,440*

CRAMER, S. N.
MCNP Code.
DE85002565/GAR *515,486*

CRAMPES, J. B.
Un Systeme de Documentation Electronique (An Electronic Documentation System).
N85-13683/6/GAR *514,449*

CRANDALL, M. G.
Hamilton-Jacobi Equations in Infinite Dimensions. Part 1. Uniqueness of Viscosity Solutions,
AD-A149 094/5/GAR *515,035*

CRANE, F. L.
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NUREG/CR-3926-V1/GAR *515,483*

CRELLING, J. C.
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PB85-154722/GAR *515,672*

CRENSHAW, J.
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CROKE, M.
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CROSSMAN, F. W.
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AD-A149 037/4/GAR *514,971*

CROW, B.
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N85-13662/0/GAR *514,430*

CROWELL, J. M.
Use of a Commercial Ranging System in Field Surveys of Radioactively Contaminated Sites.
DE85002384/GAR *515,354*

CUDAK, C. A.
Transition to Detonation from Rapid-Compression (Ramp-Waves) Generated in a Burning Porous Bed,
AD-P004 345/5/GAR *515,700*

CULBERTSON, R. E.
Private Sector Evaluation: The Dominican Republic.
PB85-140135/GAR *514,470*

CULLER, J. E.
Control Aspects of the Schuchuli Village Stand-Alone Photovoltaic Power System.
N85-13157/1/GAR *514,944*

CUMMINGS, W. H.
Air Force Civilian Potential Appraisal System: Development.
AD-A148 909/5/GAR *514,515*

CUNNINGHAM, M. A.
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CUNNINGHAM, R.
Design Report on the Atmospheric Fluidized Bed Combustor at the Kentucky Center for Energy Research Laboratory,
PB85-139915/GAR *515,092*

CURTAIN, R. F.
Note on the Disturbance Decoupling Problem for Retarded Systems.
AD-A149 045/7/GAR *515,026*

CYERMAN, A.
Hemodynamics Responses to Upright Tilt at Sea Level and High Altitude,
AD-A148 848/5/GAR *514,661*

DAH-NIEN, F.
ASEE-NASA Summer Faculty Fellowship Program (Aeronautics and Research), 1984.
N85-13664/6/GAR *514,431*

DAINTY, A. M.
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NUREG/CR-4058-V1/GAR *514,772*

DALE, C.
Military and Civilian Lifetime Earnings Comparisons.
AD-A148 844/4/GAR *514,458*

DALING, P. M.
Bivalve Fouling of Nuclear Power Plant Service-Water Systems. Volume 1. Correlation of Bivalve Biological Characteristics and Raw-Water System Design,
NUREG/CR-4070-V1/GAR *514,732*

DANESI, P. R.
Actinide Separations by Supported Liquid Membranes.
DE84013462/GAR *515,386*

DANOS, W.
Risk Analysis of Crane Accidents, Gulf of Mexico OCS Region,
PB85-142743/GAR *515,187*

DANTZIG, G. B.
Economic Growth and Dynamic Equilibrium.
DE85002811/GAR *514,462*

DAUGHTON, C. G.
Steam Stripping of Oil Shale Wastewaters. LBL/SEEHRL Steam Stripper: Design, Operation, and Maintenance Manual.
DE85003058/GAR *515,089*

DAVANZO, J.
Birthspacing, Fertility, and Family Planning: Policy and Program Implications from the Malaysian Family Life Survey,
PB85-143774/GAR *514,558*

Improving Infant Nutrition, Health and Survival: Policy and Program Implications from the Malaysian Family Life Survey,
PB85-141653/GAR *514,607*

DAVIES, D. W.
Digital Signatures - An Update,
PB85-138337/GAR *514,831*

DAVIES, T. J.
Applications of Pulsed-Laser Techniques and Thermographic Phosphors to Dynamic Thermometry of Rotating Surfaces.
DE85000403/GAR *515,202*

DAVIS, J.
Hydrodynamic Response of a Radiating Al Plasma Excited by a Proton Beam.
AD-A148 904/6/GAR *515,568*

DAVIS, J. I.
Review of AVLIS Technology for Production-Scale LIS Systems and Construction.
DE85002002/GAR *515,338*

DAVIS, R.
More Limit Theory for the Sample Correlation Function of Moving Averages,
AD-A148 975/6/GAR *515,021*

DAWES, M. A.
Effects of gamma Radiation on the Sweet Potato Weevil, Cylas Formicarius Elegantulus (Summers). Progress Report, June 1984-August 1984.
DE85001412/GAR *514,370*

DE BAPTISTA, A. E.
Eulerian-Lagrangian Analysis of Pollutant Transport in Shallow Water.
PB85-144269/GAR *515,107*

DE BOOR, C.
Controlled Approximation and a Characterization of the Local Approximation Order.
AD-A149 095/2/GAR *515,036*

DE REGGI, A. S.
Transducer Hydrophone with Filled Reservoir.
PAT-APPL-6-663 969/GAR *515,233*

DEACUTIS, C.
Evaluation of Methods to Measure the Acute Toxicity of Sewage Sludge,
PB85-144061/GAR *515,103*

DEAN, R. S.
Closeout of IE Bulletin 79-09: Failures of GE Type AK-2 Circuit Breakers in Safety-Related Systems.
NUREG/CR-3791/GAR *514,790*

DEARDORFF, J. W.
Alternative to Reduction of Surface Pressure to Sea Level.
N85-13422/9/GAR *514,415*

DECKER, D. K.
Space Power Distribution System Technology. Volume 3. Test Facility Design.
N85-12936/9/GAR *515,719*

DEDE, M.
Structures to Resist the Effects of Accidental Explosions. Volume 3. Principles of Dynamic Analysis.
AD-A148 895/6/GAR *515,190*

DEEDS, W. E.
Eddy-Current Inspection for Steam Generator Tubing Program Semiannual Progress Report for Period Ending June 30, 1984.
NUREG/CR-3949-V1/GAR *515,177*

DEGAONKAR, S. S.
Solar Radio Bursts, Proton Events and Geomagnetic Activity,
AD-A149 018/4/GAR *514,385*

DEHMER, J. L.
Resonantly Enhanced Multiphoton Ionization of Molecules.
DE85000585/GAR *514,693*

DEHMER, P. M.
Resonantly Enhanced Multiphoton Ionization of Molecules.
DE85000585/GAR *514,693*

DELFS, H.
Development of a Feasibility Model for a Thin-Film Precision Power Meter.
N85-13217/3/GAR *515,226*

DELGASS, W. N.
CO+ H Sub 2 Reaction over Nitrogen-Modified Iron Catalysts. Quarterly Technical Progress Report, April 1, 1984-June 30, 1984.
DE85000025/GAR *515,607*

DELOINCE, R.
Etude des Hepatites Virales (Study of Viral Hepatitis).
PB85-142768/GAR *514,590*

DELOMBARD, R.
Control Aspects of the Schuchuli Village Stand-Alone Photovoltaic Power System.
N85-13157/1/GAR *514,944*

DELVIN, W. L.
Characteristics of Quality Data.
DE85001203/GAR *514,444*

Quality of Scientific and Engineering Data.
DE85000294/GAR *514,428*

DEMARTINI, B. J.
Use of the ORACLE DBMS in Determining the Response of Complex Scientific Instrumentation.
DE85001742/GAR *515,328*

DEMMER, W.
Development of Components for Micro-C Oriented Sensor Systems.
N85-13215/7/GAR *515,224*

DEMUTH, J. E.
High Resolution Electron Energy Loss Studies of Fermi-Level States of Clean and Metallized Si(111) Surfaces.
AD-A148 933/5/GAR *515,584*

DENGEL, O.
NATO AC/310 Activities Report on NATO STANAG 4170 and Allied Ordnance Publication 7, AOP-7 (Manual of Tests for Qualification of Explosive Materials for Military Use).
AD-P004 341/4/GAR *515,494*

DENNEHY, G.
Evaluation of Modifications to the Mastin Double-Envelope House.
DE85002786/GAR *514,913*

DENNISON, E. W.
Concentrator Optical Characterization Using Computer Mathematical Modelling and Point Source Testing.
N85-13375/9/GAR *514,920*

DENNY, E. C.
Pilot Program for an Automated Data Collection System.
DE84016809/GAR *515,473*

DERENNA E SOUZA, C.
Inducao de Regras de Decisao Nebulosas (Induction of Fuzzy Decision Rules).
N85-13525/9/GAR *515,053*

DERR, R. L.
Report on AGARD Meeting Hazards Studies for Solid Propellant Rocket Motors,
AD-P004 340/6/GAR *515,695*

DETILLEUX, E.
Processing of Highly Radioactive Nuclear Waste.
DE84901805/GAR *515,387*

DETRAGIACHE, P.
Collective Effects in Spin Polarized Plasmas.
DE85002702/GAR *515,572*

DEVORE, C. R.
Vectorization and Implementation of an Efficient Multigrid Algorithm for the Solution of Elliptic Partial Differential Equations.
AD-A149 049/9/GAR *515,029*

DEWEY, B. R.
Modeling for Ultrasonic Nondestructive Evaluation or Columnar Structures in Anisotropic Materials. Progress Report.
DE85000435/GAR *515,518*

Modelling for Ultrasonic Nondestructive Evaluation of Columnar Structures in Anisotropic Materials. Final Report.
DE85001065/GAR 515,522

DI CIACCIO, A.

Compensation Effects in Hadron Calorimeters.
DE85002594/GAR 515,358

DIAS, O. P.

Selecao de Projetos de p and D COM Retornos Nao-Numericos (R and D Project Selection with Nonnumerical Returns).
N85-13665/3/GAR 515,054

DIETERICH, R.

Qualitative Assessment of Selected Regional Training Institutions in West and Central Africa,
PB85-134716/GAR 514,535

DIETRICH, G.

Development and Testing of Thin Film Cells for High Temperature Water Vapor Electrolysis.
N85-13001/1/GAR 514,702

DIETRICHS, H. J.

Increase of Efficiency in Cooled High Temperature Turbines. Phase I.
DE84752109/GAR 515,681

DIETRICK, D. L.

MHD Generator Electrode Development. Summary Report, July 1, 1981-September 30, 1982.
DE85002156/GAR 514,938

DIEWALD, C. A.

Definition of Technology Development Missions for Early Space Station Satellite Servicing. Volume 2. Technical.
N85-12923/7/GAR 515,708

DIFILIPPO, F. C.

Flux Synthesis for the on-Line Surveillance of Nuclear Power Plants.
DE85000928/GAR 515,485

DIKKERS, R. D.

Research Priorities for Improving the Effectiveness of Active Solar Hot Water and Space Conditioning Systems.
PB85-153443/GAR 515,076

DINGER, U.

Measure Determining Classes of Balls in Banach Space.
N85-13541/6/GAR 515,044

DIVER, R. B.

Simple Model for Predicting the Flux Distribution through the Focal Plane of a Multifaceted-Concentrator Solar Furnace.
AD-A149 063/0/GAR 515,059

DIVITA, J.

Effect of Extreme Peripheral Light on Dark Adaptation.
AD-A148 923/6/GAR 514,647

DOALI, J. O.

Effects of Perforation L/D Ratio and Slotting on Stick Propellant Combustion.
AD-A148 854/3/GAR 515,490

DOBBINS, M. S.

Molten Salt Reactor for Dispersed Solid Phase Chlorination.
DE85002611/GAR 514,678

DOBBS, N.

Structures to Resist the Effects of Accidental Explosions. Volume 3. Principles of Dynamic Analysis.
AD-A148 895/6/GAR 515,190

DOBYSH, A. V.

Study of the Pore Structure of Ceramics Prepared by the Slip Casting Method.
N85-13048/2/GAR 514,962

DODD, C. V.

Eddy-Current Inspection for Steam Generator Tubing Program Semiannual Progress Report for Period Ending June 30, 1984.
NUREG/CR-3949-V1/GAR 515,177

DOHERTY, T. J.

Underground Pumped Hydroelectric Storage.
DE85000288/GAR 514,953

DOLBEARE, R. T.

Vibration Isolated Cold Plate Assembly.
PAT-APPL-6-666 786/GAR 515,168

DOLEZAL, P. K.

Leadership Development in the Civilian Work Force.
AD-A148 955/8/GAR 514,518

DOMAGALA, R. F.

Differential Thermal Analysis Study of U sub 3 Si-Al and U sub 3 Si sub 2 -Al Reactions.
DE85002647/GAR 515,489

DOMINGUEZ, S. E.

Effect of Pentachlorophenol on the Growth and Mortality of Embryonic and Juvenile Steelhead Trout.
PB85-144129/GAR 514,574

DOMINIC, R. J.

Turbine Blade Damping Study.
N85-12890/8/GAR 515,683

DONOHUE, M. L.

Mirror Advanced Reactor Study (MARS). Final Report. Volume 1-A. Commercial Fusion Electric Plant.
DE85001727/GAR 515,325

Mirror Advanced Reactor Study (MARS). Final Report. Volume 1-B. Commercial Fusion Electric Plant.
DE85001729/GAR 515,327

Mirror Advanced Reactor Study (MARS). Final Report. Volume 2. Commercial Fusion Synfuels Plant.
DE85001728/GAR 515,326

DONOVAN, W. F.

Hypothetical Zero Yaw Drag Trajectory of Spinning Projectiles between M = 5 and M = 10.
AD-A148 899/8/GAR 515,492

DORAN, D. G.

Spectral Effects in FMIT (Fussion Materials Irradiation Test Facility).
DE85001407/GAR 515,321

DORNSIFE, W. P.

Low Level Radioactive Waste Disposal Siting: A Social and Technical Plan for Pennsylvania. Volume 1. An Overview of Options and Alternatives.
DE85002332/GAR 515,407

Low Level Radioactive Waste Disposal Siting: A Social and Technical Plan for Pennsylvania. Volume 2. Socioeconomic Analyses.
DE85002331/GAR 515,406

Low Level Radioactive Waste Disposal Siting: A Social and Technical Plan for Pennsylvania. Volume 3. Technical Analyses.
DE85002330/GAR 515,405

Low Level Radioactive Waste Disposal Siting: A Social and Technical Plan for Pennsylvania. Volume 4. Annotated Bibliography.
DE85002333/GAR 515,408

DOSCH, F.

Development of a Feasibility Model for a Thin-Film Precision Power Meter.
N85-13217/3/GAR 515,226

DOSS, K. G. R.

GSI-LBL Plastic Ball/Wall Spectrometer.
DE85001651/GAR 515,351

DOSSANTOS, A. R.

Relatorio Do Trabalho de Campo Realizado NAS Bacias DOS Rios Quebra Osso E Tanque Preto, NA Quadricula de Catas Altas, Minas Gerais (Report of the Field Work Performed in the Basins of the Quebra Osso and Tanque Petro Rivers in the Catas Altas Quadrangle, Minas Gerais).
N85-13359/3/GAR 514,745

DOUGHERTY, D. R.

Evaluation of the Effects of Gamma Irradiation on the Mechanical Properties of High Density Polyethylene,
NUREG/CR-3898/GAR 515,012

DOUVAN, E.

Social Roles and the Health of American Women.
PB85-147452/GAR 514,620

DOVE, W. P.

Object-Oriented Signal Processing Environment: The Knowledge-Based Signal Processing Package.
AD-A148 963/2/GAR 514,809

DOWSON, M.

Distributed Data Processing Design Methodology.
AD-A148 888/1/GAR 514,804

DRAGOVAN, M.

Detection of Submillimeter Polarization in the Orion Nebula.
N85-13700/8/GAR 514,388

DRAHEIM, P.

Development of Components for Micro-C Oriented Sensor Systems.
N85-13215/7/GAR 515,224

DRAKE, A. F.

Frequency Dependence of Effective Nasal Resistance.
PB85-144095 514,591

DRAKE, M. C.

Kinetics of Nitric Oxide Formation in Laminar and Turbulent Methane Combustion.
PB85-149698/GAR 514,716

DRENNON, B. J.

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DUMAS, D. P.

Coupleur Semi Passif Integre pour Reseau a Fibres Optiques (Integrated Semi-Passive Coupler for Optical Fiber System),
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DURFEE, E. H.

Distributing a Distributed Problem Solving Network Simulator,
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DURIVAUD, G.

L'Electroformage du Nickel (Electroforming of Nickel).
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DUTZI, E. J.

Direct Coal Combustion Data Handbook.
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DWYER, D. J.

Some Experiences of Testing Protocol Implementations,
PB85-138345/GAR 514,832

DYE, D. M.

High Resolution Computed Tomography for Solid Modeling and Computer Aided Design.
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DYLLA, H. F.

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DZIEGIELEWSKI, B.

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ECCLESTON, G. W.

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EDMUNDS, T. M.

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EDWARDS, M.

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EDWARDS, W. V.

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EICHHORN, W.

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EIDSON, A. F.

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EILINGSFELD, H.

Fluorescent Dyes for Luminescent Solar Concentrators.
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EINHAUS, R. L.

Acute Toxicity of Thionyl Chloride Vapor for Rats.
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EISEN, Y.

Evaluation of the sup 63 Cu Activation Foil for Determining the Neutron Dose in the Energy Range of 1 EV to 1 MeV.
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EISENHOWER, B. M.

ORNL (Oak Ridge National Laboratory) Resource Conservation and Recovery Training Program.
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EL-SIRAGY, N. M.

Raman Sidescattering in Laser-Produced Plasmas.
AD-A148 905/3/GAR 515,569

ELDER, J.

Guide to Radiological Accident Considerations for Siting and Design of DOE Nonreactor Nuclear Facilities.
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PERSONAL AUTHOR INDEX

ELLIS, H. W.
Spark Decomposition of SF sub 6 ; Toxicity of by-Products.
DE85000161/GAR *514,692*

ELMORE, M. R.
Evaluation of Chemical Stabilizers and Windscreens for Wind Erosion Control of Uranium Mill Tailings.
DE85000828/GAR *515,396*

ELY, J. F.
Application of the Extended Corresponding States Model to Hydrocarbon Mixtures (Computer Program EXCST).
PB85-151744 *514,721*

EMAD, F. P.
ASEE-NASA Summer Faculty Fellowship Program (Aeronautics and Research), 1984.
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EMBERLEY, L. W.
Graphics Translators for Computer-Aided Drafting and Design: Interface Alternatives for the A/E Community.
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EMBRECHTS, M. J.
Compact Reversed-Field Pinch Reactors (CRFPR): Preliminary Engineering Considerations.
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ENG, E.
Environmental Sanitation Master Plan for Training and Education in Tanzania.
PB85-143022/GAR *515,101*

ENGEL, J. H.
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ERICKSON, J. B.
System Status Display Information.
N85-12889/0/GAR *514,341*

ERIKSSON, K.
Time Discretization of Parabolic Problems by the Discontinuous Galerkin Method.
N85-13543/2/GAR *515,046*

ERUP, L.
Transmission Analysis for the Use of 2-4 PSK (Phase Shift Keying) Modulation in Satellite Broadcasting.
N85-13151/4/GAR *515,290*

ESCANDE, B.
Calcul d'Ecoulements Internes a Grand Nombre de Reynolds par Resolution Numerique des Equations de Navier-Stokes (Computation of Internal Flows at High Reynolds Number by Numerical Solution of the Navier-Stokes Equations),
PB85-140895/GAR *515,539*

ESSIG, S. S.
Evaluation of an Advanced Combat Vehicle Identification (CVI) Training Program (Masking): A New Approach to Target Acquisition Training.
AD-A148 911/1/GAR *514,516*

ETCHEPARE, J.
Obturateur a Effet Kerr Optique. Rapport de Synthese Finale (Obturator with Optic Kerr Effect. Final Report),
PB85-137289/GAR *514,711*

EUBANK, B. F.
Operations FLINTLOCK and LATCHKEY Events RED HOT, PIN STRIPE, DISCUS THROWER, PILE DRIVER, DOUBLE PLAY, NEWPOINT, MIDI MIST, 5 March 1966-26 June 1967.
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EZZELL, J. W.
Anthrax Toxin,
AD-A148 936/8/GAR *514,668*

FAGERBURG, T. L.
Fixed-Cone Valve Prototype Tests, New Melones Dam, California.
AD-A148 939/2/GAR *515,174*

FAHRENSCHON, K.
Investigation and Development of Multicolored Liquid Crystal Display Systems for Automotive Dashboard Application and Large Format Information Boards.
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FAINBERG, J.
Interplanetary Radio Storms. 2: Emission Levels and Solar Wind Speed in the Range 0.05-0.8 AU.
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FALCONER, J. L.
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FALETTI, D. W.
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FAMIGLIETTI, M.
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FANNIN, K. F.
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FANTON, J. W.
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AD-A148 869/1/GAR *514,578*

FARBER, B. F.
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FARLEY, K. J.
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FARRINGTON, G. C.
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DE85001032/GAR *514,955*

FAVRE, J. P.
Interaction Fatigue - Fluage dans les Composites Carbone/Resine + or - 45 degrees (Interaction Fatigue - Creep in Carbon/Resin Compounds + or - 45 degrees),
PB85-141588/GAR *514,982*

FEARING, R. S.
Simplified Grasping and Manipulation with Dextrous Robot Hands.
AD-A148 962/4/GAR *515,163*

FEDERICI, C.
Essais de Susceptibilite a Une Agression Electromagnetique (Tests for Susceptibility to Electromagnetic Attack).
N85-13154/8/GAR *515,345*

FEHLAU, P. E.
Application of Wald's Sequential Probability Ratio Test to Nuclear Materials Control.
DE85002017/GAR *515,479*

FEITKNECHT, W.
Alpha-Form of the Hydroxides of Bivalent Metals.
N85-13009/4/GAR *514,705*

FELCH, K. L.
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FELDERMAN, E. J.
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FELDMAN, E. E.
Unprotected Loss-of-Heat Sink Simulation in the EBR-II Plant.
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FELDMAN, G. J.
4 pi Detectors.
DE85002605/GAR *515,359*

FELDMESSER, J.
Soil Sampling Apparatus.
PAT-APPL-6-837 241/GAR *514,780*

FERAUDI, M.
Prevalencia de Bocio Endemico en la Poblacion escolar de Bolivia (Prevalence of Endemic Golter in the School Population of Bolivia),
PB85-137925/GAR *514,505*

FERGUSON, J. M.
Finite Element Method for Solving Neutron Transport Problems.
DE85001075/GAR *515,379*

FERGUSON, R. L.
Large Acceptance Spectrometers for pi exp 0 Mesons.
DE85002472/GAR *515,357*

FERNANDEZ, S. J.
Determination of Iodine Specific Activity in Nuclear Fuel Reprocessing Plant off-Gases.
DE85000193/GAR *515,475*

FERRALL, J. F.
Direct Coal Combustion Data Handbook.
DE85001028/GAR *515,624*

FFOLLIOTT, P. F.
Manejo de Cuencas y Monitoreo Ambiental (Watershed Resources Management and Environmental Monitoring),
PB85-141711/GAR *515,098*

FIDLER, R.
Air Abrasive Equipment for the Measurement of Residual Stresses in the Bores of Pipes and Tubes,
PB85-143170/GAR *515,180*

FIDLER, R. S.
Sodium Chemistry in the MEL In-Sodium Creep Facilities,
PB85-143139/GAR *515,237*

FIETZ, W. A.
Startup of Large Coil Test Facility.
DE85001669/GAR *514,789*

FIFE, K. W.
Recent Development in Pyrochemistry at Los Alamos.
DE85000174/GAR *515,388*

FINDLAY, R. H.
An Experimental Investigation of Enhanced Harpacticoid (Copepoda) Abundances Around Isolated Seagrass Shoots.
AD-A148 918/6/GAR *514,731*

FINEGOLD, J. G.
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FISCHER, E. A.
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FISCHER, N. D.
Frequency Dependence of Effective Nasal Resistance.
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FISCHER, R. D.
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FISHER, J. E.
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FISHER, R. S.
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FITZGERALD, M. L.
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FITZPATRICK, G. J.
Streamer Initiation in Liquid Hydrocarbons under Divergent Field Conditions.
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FJELDAAS, S.
Basis for a Geometric Modeller,
PB85-140861/GAR *514,837*

FLANAGAN, C. A.
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FLANIGAN, V. J.
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FLETCHER, E. A.
Simple Model for Predicting the Flux Distribution through the Focal Plane of a Multifaceted-Concentrator Solar Furnace.
AD-A149 063/0/GAR *515,059*

FLIGG,
Sector Suite Man/Machine Functional Capabilities and Performance Requirements.
AD-A148 881/6/GAR *514,803*

FOERST, R.
International Comparative Study of Systems for the Government Advancement of Research and Development.
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FOLDS, D. J.
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FOLEY, W. J.
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FONG, W. S.
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FONTANGES, R.
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FORBUS, K. D.
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FORD, P. C.
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FORD, R. R.
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FORSTER, E. O.
Streamer Initiation in Liquid Hydrocarbons under Divergent Field Conditions.
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FOUSEK, R. J.
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FOUTY, S. C.
Index to Published Geologic Maps in the Region around the Potential Yucca Mountain Nuclear Waste Repository Site, Southern Nye County, Nevada.
DE85000260/GAR 515,389

FOX, L. J.
60 GHz Gyrotron Development Program. Quarterly Report No. 19, January-March 1984.
DE85000599/GAR 515,314

FRANCESCONI, R. P.
Food Deprivation and Exercise in the Heat: Thermoregulatory and Metabolic Effects,
AD-A148 847/7/GAR 514,660

FRANKS, L. A.
Applications of Pulsed-Laser Techniques and Thermographic Phosphors to Dynamic Thermometry of Rotating Surfaces.
DE85000403/GAR 515,202

FRASER, C. M.
Derivative Expansions of Fermion Determinants: Anomaly-Induced Vertices, Goldstone-Wilczek Currents, and Skyrme Terms,
PB85-139756/GAR 515,566

FRAZIER, B.
Manual for Building Temporary Emergency Shelters (Manual para la Construccion de Abrigos de Emergencia Temporales) (Manuel pour la Construction des Abris D'Urgence Temporaires) (Kitab li bina Ma'Wa Muwagat fii Halat at Tawara),
PB85-143808/GAR 515,123

FREEMAN, H. D.
Engineered Sorbent Barriers for Low-Level Waste.
DE85000833/GAR 515,397

FRELIN, A. J.
Army Nurse Corps Personnel Management Practices (Executive Summary).
AD-A148 890/7/GAR 514,579

FRENKEL, A.
Search for the Radiative Decay of a Cosmic Relic Particle with IUE.
N85-13707/3/GAR 514,394

FREY, R. B.
Some Aspects of the Micromechanics of Hot Spot Formation in Energetic Materials,
AD-P004 348/9/GAR 515,495

FRICK, J.
Rotationsinelastic Streuung von He-Atoms an HF-, HCl-, CF4-, SF6-, C2H6- und C2F6-Molekuelen (Rotational Inelastic Scattering of He-Atoms at HF-, HCl-, CF4-, SF6-, C2H6- and C2F6-Molecules).
N85-13590/3/GAR 514,710

FRIEDLANDER, A.
Yaughan and Curriboo Plantations: Studies in Afro-American Archaeology.
AD-A148 985/5/GAR 514,508

FRIEDMAN, M.
Effect of Ventilation and Perfusion Imbalance on Inert Gas Rebreathing Variables.
PB85-144087 514,650

FRIES, S.
Test Field Pellworm for Wind Turbines.
DE84752110/GAR 514,882

FRILEY, J. R.
Comparison of Structural Computer Programs Used for the Analysis of Spent Fuel Shipping Casks.
DE85002444/GAR 515,385

Pipe-to-Pipe Impact Program.
DE84013162/GAR 515,429

FRISH, M. B.
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FRUCHTER, J. S.
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NUREG/CR-3712/GAR 515,423

FRY, D. N.
Report of the First United States Conference on Utility Experience with Neutron Noise Analysis.
DE85002459/GAR 515,447

FUJII, R. U.
Report on the Status of the Development of the IEEE (Institute of Electrical and Electronics Engineers) Standard for Software Verification Plans (P1012).
PB85-151769 514,839

FUJITA, T.
Review of Solar Fuel-Producing Quantum Conversion Processes.
DE85000336/GAR 515,617

Solar Photochemical Process Engineering for Production of Fuels and Chemicals.
DE85000335/GAR 515,616

FULCO, C. S.
Hemodynamics Responses to Upright Tilt at Sea Level and High Altitude,
AD-A148 848/5/GAR 514,661

FULLTON, J. M.
Frequency Dependence of Effective Nasal Resistance.
PB85-144095 514,591

FUNG, A. K.
Scattering Models in the Microwave Regime.
N85-13361/9/GAR 515,591

FURTH, H. P.
PPPL Tokamak Program.
DE85002703/GAR 515,334

FURUKAWA, T. P.
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AD-A149 034/1/GAR 514,663

GABRIEL, T. A.
Compensation Effects in Hadron Calorimeters.
DE85002594/GAR 515,358

GADZUK, J. W.
Vibrational Excitation, Harpooning, and Sticking in Molecule-Surface Collisions.
PB85-151603 514,719

GAKSTATTER, J. H.
Biological Methods for Determining Toxicity of Contaminated Freshwater Sediments to Invertebrates.
PB85-144103/GAR 514,672

GALEY, W. R.
Effect of Inert Gases on Ion Transport Across the Erythrocyte Membrane.
AD-A148 889/9/GAR 514,644

GALLAGHER, J. S.
Thermodynamic Properties of Isobutane-Isopentane Mixtures from 240 to 600K and up to 20 MPa (with Supplemental Tables from -40 to + 600F and up to 1000 psia).
PB85-154581/GAR 514,725

GALLUSCIO, E. H.
Multiple Resources and Brain Laterality.
AD-A148 912/9/GAR 514,645

GARCIA, L.
Analysis of Watershed Management (El Salvador, Guatemala, Honduras),
PB85-141745/GAR 515,099

Calculation of Stellarator Equilibria in Vacuum Flux Surface Coordinates.
DE85001693/GAR 515,322

GARMLAND, S.
Pulse Injection on a Power Cable Penetrating a Shielding Wall by Feed-Through Capacitors.
N85-13171/2/GAR 514,793

GAROW, J.
Regenerative Fuel Cell Energy Storage System for a Low Earth Orbit Space Station.
N85-13371/8/GAR 514,945

GARROW, P. H.
Yaughan and Curriboo Plantations: Studies in Afro-American Archaeology.
AD-A148 985/5/GAR 514,508

GASSER, R. D.
MARCON - Development and Applications to Containment Loading Calculations.
DE85002442/GAR 515,384

GATTO, F. B.
Infrared-Thermal Wave Scanner for NDE of Naval Thermal Spray Coatings.
DE85002237/GAR 515,205

GAWRON, V. J.
Effects of Side Impact Padding on Driver Performance.
PB85-136372/GAR 515,129

GAYOU, D. E.
High Resolution Computed Tomography for Solid Modeling and Computer Aided Design.
DE85000085/GAR 515,147

GEARHEART, R. A.
Environmenal Sanitation Master Plan for Training and Education in Tanzania.
PB85-143022/GAR 515,101

GEE, G. W.
Predicting Long-Term Moisture Contents of Earthen Covers at Uranium Mill Tailings Sites.
DE85000777/GAR 515,392

Transport Assessment - Arid: Measurement and Prediction of Water Movement Below the Root Zone.
DE85000834/GAR 515,398

GELDREICH, E. E.
Heterotrophic Bacteria in Potable Water: Progress in Method Options and Monitoring Benefits,
PB85-144152/GAR 515,105

'Klebsiella' Occurrence, Significance and Detection in Water Systems: A Progress Report,
PB85-144160/GAR 514,696

GELLMAN, A. J.
Studies of the Kinetics and Mechanisms of Ammonia Synthesis and Hydrodesulfurization on Metal Single Crystal Surfaces.
DE85001650/GAR 514,697

GENTRY, G. L.
Evaluation of the Langley 4- by 7-Meter Tunnel for Propeller Noise Measurements.
N85-13553/1/GAR 515,229

GERMANE, G. J.
Fundamental Combustion Studies of Low-Rank Coal Slurries. Monthly Progress Report, 1 October 1984-31 October 1984.
DE85002496/GAR 515,656

GERMER, W.
Development of Components for Micro-C Oriented Sensor Systems.
N85-13215/7/GAR 515,224

GERONE, P. J.
Biomechanical Studies of Impact Acceleration Research.
AD-A149 077/0/GAR 514,665

GHIA, S.
Qualificazione di Sistemi Non-Invasivi Per la Rivelazione on-Line di Perdite in Preriscaldatori d'Acqua Alimento AD Alta Pressione (Qualification of Noninvasive Systems for on-Line Leak Detection in High Pressure Feed Water Preheaters).
N85-13555/6/GAR 515,230

GHILADI, A.
Rotational Sound Development in Axial Turbomachinery and the Propagation in the Connected Tubing.
DE84770493/GAR 514,888

GIBBONS, J. H.
Energy Management: Theory and Practice. Final Report.
DE85000646/GAR 514,901

GIDDINGS, J. C.
Field-Flow Fractionation in the Analysis of Energy Related Materials. Progress Report, February 1, 1984-January 31, 1985.
DE85000869/GAR 514,676

GIGUERE, P.
Los Alamos Nuclear Plant Analyzer: An Interactive Power-Plant Simulation Program.
DE85002412/GAR 515,445

GILBERT, E. S.
Krypton-85 Health Risk Assessment for a Nuclear Fuel Reprocessing Plant.
DE85000838/GAR 514,615

GILBERT, P. A.
Investigation of Density Variation in Triaxial Test Specimens of Cohesionless Soil Subjected to Cyclic and Monotonic Loading.
AD-A148 944/2/GAR 514,778

GILCHRIESE, M. G. D.
4 pi Detectors.
DE85002605/GAR 515,359

GILLI, M.
Les Systemes de Lancements (Launching Systems).
N85-12917/9/GAR 515,721

GIRVIN, D. C.
Radionuclide Migration in Groundwater - Annual Report for FY 1983.
NUREG/CR-3712/GAR 515,423

GIRVIN, S. M.
Electron-Phonon Interactions and the Breakdown of the Dissipationless Quantum Hall Effect.
PB85-151595 515,586

PERSONAL AUTHOR INDEX

GIVIDEN, G. M.
Fire Support Team Vehicle (FIST-V) System: An Analysis of Human Factors, Training, Safety and Related Considerations.
AD-A149 070/5/GAR *515,504*

GLACKIN, D. L.
Multisensor Satellite Data Integration for Sea Surface Wind Speed and Direction Determination.
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Guidelines - Design to Minimize Contamination and to Facilitate Decontamination of Military Vehicles and Other Equipment: Interiors and Exteriors.
AD-A149 088/7/GAR *515,259*

HILLEKAMP, R.
Efficient Algorithm for Fuzzy Linear Programming with Multiple Objectives.
AD-A149 012/7/GAR *515,051*

HILLS, H. K.
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HILZINGER, R.
Development of Rapidly Quenched Alloys with Special Physical Properties and of Processes for Their Continuous Production.
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HINTZ, G. W.
Efficient Algorithm for Fuzzy Linear Programming with Multiple Objectives.
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HIRSHMAN, S. P.
Convergent Spectral Representation for Three-Dimensional Inverse MHD Equilibria.
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HO, Y. K.
Oscillator Strengths for OII Ions.
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HOAG, H.
Notes on the RF System for the SLC Positron Source.
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HOBBS, P. V.
Studies of the Mechanisms and Rates with Which Nitrogen Species are Incorporated into Cloud Water and Precipitation.
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HOBBS, R. W.
Data Acquisition and Control System for the K/sub 1C/-HSST Experiments at the ORR.
DE85001135/GAR *515,438*

HOCHULI, U.
Investigation of RF Excited CW CO2 Waveguide Lasers.
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HOCK, S.
Development of Rapidly Quenched Alloys with Special Physical Properties and of Processes for Their Continuous Production.
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HODEL, W.
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HODGES, G. R.
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HODGKISS, W. S.
Surface Projections of Array Beam Patterns.
AD-A148 999/6/GAR *515,278*

HODGKISS, W. S. JR.
An Oceanic Reverberation Model.
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Magnetic Inductive Flowmeter for Low Conducting Liquids.
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HOGAN, W. J.
Comparison of Three ICF Reactor Designs.
DE85001211/GAR *515,320*

HOLDREN, M.
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PB85-144046/GAR *515,239*

HOLFORD, D. M.
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HOLLAND, R. A.
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HOLLERBACH, J. M.
Planning of Minimum-Time Trajectories for Robot Arms.
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HOLM, D. D.
Richardson Number Criterion for the Nonlinear Stability of Three-Dimensional Stratified Flow.
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HOLTON, R. J.
Calculation of Si(Li) X-Ray Detector Efficiencies.
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HOMA, M. I.
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HONADLE, G.
Private Sector and the Economic Development of Malawi.
PB85-140606/GAR *514,473*

HOOD, A.
Geomorphology and Archaeology of Carnegie Canyon, Fort Cobb Laterals Watershed, Caddo County, Oklahoma.
PB85-144673/GAR *514,511*

HOOVER, D. B.
Geological and Geophysical Evidence of Structures in Northwest-Trending Washes, Yucca Mountain, Southern Nevada, and Their Possible Significance to a Nuclear Waste Repository in the Unsaturated Zone.
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HORD, J.
Snapshot of the NBS (National Bureau of Standards) Center for Chemical Engineering.
PB85-151751 *514,680*

HORELICK, D.
Versatile CAMAC Power Supply Controller-Monitor with Built-in Ramping and Ripple Monitor.
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HORN, D. A.
MIZEX (Marginal Ice Zone Program): A Program for Mesoscale Air-Ice-Ocean Interaction Experiments om Arctic Marginal Ice Zones. V. MIZEX 84. Summer Experiment PI (Principal Investigator) Preliminary Reports,
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HORN, R. E.
Coaxial Cavity Gunn Oscillator Using Probe Coupled Microstrip.
PAT-APPL-6-679 972/GAR *514,867*

Image Line Voltage Controlled Oscillator with Replaceable Components.
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HORNE, G. P.
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HORNET, P.
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HORNY, G.
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HORTON, K. K.
Operations FLINTLOCK and LATCHKEY Events RED HOT, PIN STRIPE, DISCUS THROWER, PILE DRIVER, DOUBLE PLAY, NEWPOINT, MIDI MIST, 5 March 1966-26 June 1967.
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HORWITZ, E. P.
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HOUSER, M. E.
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HSUE, S. T.
Nondestructive Assay System Development for a Plutonium Scrap Recovery Facility.
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HSUEH, Y.
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HUBBARD, A. T.
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HUBBARD, G. B.
Squamous Cell Carcinoma with Metastasis in a Rhesus Monkey (Macaca mulatta).
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HUBBARD, H. H.
Response Measurements for Two Building Structures Excited by Noise from a Large Horizontal Axis Wind Turbine Generator.
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HUBBARD, J. B.
Electrostriction and Dielectric Friction on Ions Moving through Compressible Polar Solvents.
PB85-151702 *514,720*

HUBBARD, R. W.
Food Deprivation and Exercise in the Heat: Thermoregulatory and Metabolic Effects,
AD-A148 847/7/GAR *514,660*

HUBBELL, R. L.
Dissent, Objectivity and Ethics in Program Evaluation,
PB85-144608/GAR *514,436*

HUDLICKA, E.
Design of a Knowledge-Based Fault Detection and Diagnosis System,
AD-A148 859/2/GAR *514,422*

Meta-Level Control through Fault Detection and Diagnosis,
AD-A149 084/8/GAR *514,815*

HUFFER, F.
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AD-A149 015/0/GAR *515,052*

HUGHES, R.
H8-1 and H8-2 Cataloging Handbooks.
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HULL, J. R.
Mathematical Modeling and Evaluation of Radionuclide Transport Parameters from the ANL Laboratory Analog Program.
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HULLANDER, E. L.
Financial Leverage Potential of Local Currency Proceeds Generated from the Food for Peace Program to Stimulate Private Enterprise in Developing Countries,
PB85-143097/GAR *514,481*

HUNOLD, K.
Development and Fabrication of Refractory Bodies for Gas Turbine Engines.
N85-12899/9/GAR *515,686*

HUNT, R. W.
Evaluation of Small Enterprise Programs and Projects: Issues in Business and Community Development.
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Neutron and gamma-Ray Dose Measurements at Various Distances from the Little Boy Replica.
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HURLEY, C. F.
Produced Fluid Emulsions. Final Report.
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HURLEY, J. P.
Building 1 Cooling Tower Ozone Project.
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HUSTAD, J. E.
Experimental Study of Turbulent Jet Diffusion Flames (Revised Version),
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HUSTON, W.
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PB85-153443/GAR *515,076*

HUTCHINSON, R. A.
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HYMAN, J.
Ion Thruster System (8-cm) Cyclic Endurance Test.
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IKONEN, K.
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Progress in the Development of a Two-Fluid Model of Turbulence for Near-Wall Flows. Part 3: Preliminary Investigation of a Stably-Stratified Boundary Layer.
N85-13197/7/GAR *515,536*

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IMMARIGEON, J-P.
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IMMERMAN, W. H.
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ITO, Y.
Multi-Layer Coil Countercurrent Chromatograph with Adjustable Revolutional Radius.
PATENT-4 487 693 *515,234*

IVINS, B. E.
Anthrax Toxin,
AD-A148 936/8/GAR *514,668*

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Filter Reflection Image Guide Oscillator and Solid State Line Scanning Device.
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JACOBS, I. S.
Advanced Artificial Dielectric Materials for Millimeter Wavelength Applications.
AD-A148 960/8/GAR *514,970*

JACOBSEN, R. T.
Thermodynamic Properties of Ethylene at Saturation.
PB85-151777 *514,722*

JACOBY, J. J.
Antiplane Cracks in Solid Propellants,
AD-P004 344/8/GAR *515,699*

JACQUES, R. G.
Real-Time Message Process Simulation Capability.
AD-A149 017/6/GAR *515,282*

JAEGER, W.
Partikelmitfuehrung in Einem Kompressiblen Wirbel (Particle Entrainment in a Compressible Vortex).
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JAEGGY, B. C.
Etude Par Anemometrie Laser d'Ecoulements Decolles sur des Profils d'Aile (Laser Anemometer Study of Separated Flow on Wing Profiles).
N85-12872/6/GAR *514,324*

PERSONAL AUTHOR INDEX

JAHANGIRI, M.
Thermodynamic Properties of Ethylene at Saturation.
PB85-151777 *514,722*

JAKOB, F. E.
Assessment of Ground-Coil Heat-Pump Technology.
DE85002587/GAR *515,071*

JAMES, E.
Measurement of Shock Induced Reaction in Rocket Propellants by Nanosecond Infrared Radiometry and Photography.
AD-P004 349/7/GAR *515,701*

JAMES, K.
Fiber Optic, Febry-Perot High Temperature Sensor.
N85-13594/5/GAR *515,232*

JANARDAN, B. A.
Experimental Investigation of Shock-Cell Noise Reduction for Dual-Stream Nozzles in Simulated Flight.
N85-13549/9/GAR *515,687*

Experimental Investigation of Shock-Cell Noise Reduction for Single Stream Nozzles in Simulated Flight.
N85-13550/7/GAR *515,688*

JANULIS, J.
Biogasification of Walt Disney World Biomass Waste Blend.
PB85-156958/GAR *515,674*

JARMIE, N.
Low-Energy Nuclear Reactions with Hydrogen Isotopes.
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JENNINGS, P. R.
Mejoramiento de Arroz (Rice Improvement),
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JERBY, E.
Axial Velocity Spread Acceptance of Free Electron Lasers.
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JEUNHOMME, L.
Coupleur Semi Passif Integre pour Reseau a Fibres Optiques (Integrated Semi-Passive Coupler for Optical Fiber System),
PB85-144699/GAR *515,552*

JIA, R. Q.
Controlled Approximation and a Characterization of the Local Approximation Order.
AD-A149 095/2/GAR *515,036*

JIA, S. B.
Laminar Jet Issuing into Stagnant Surroundings.
N85-13200/9/GAR *515,538*

JIN, K. K.
Improved Magnetic Bias and Delay Linearity in a Magnetostatic Wave Delay Line.
PAT-APPL-6-664 193/GAR *514,795*

JOHANNESSEN, O. M.
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JOHN, S. L.
Concentrator Optical Characterization Using Computer Mathematical Modelling and Point Source Testing.
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JOHNSON, B.
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PB85-132207/GAR *515,184*

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National Fire Incident Reporting Systems (NFIRS) Data Base (1983 Incident File).
PB85-132231/GAR *515,186*

JOHNSON, B. A.
XSP(Experimental Static Penetrometer) Cone Penetrometer: A Performance Evaluation.
AD-A148 886/5/GAR *514,777*

JOHNSON, C.
Time Discretization of Parabolic Problems by the Discontinuous Galerkin Method.
N85-13543/2/GAR *515,046*

JOHNSON, D. L.
Global Matrix of Thermospheric Density Values for Selected Solar/Geomagnetic Conditions and Spacecraft Orbital Attitudes.
N85-13409/6/GAR *514,407*

JOHNSON, J. A.
Army Drug Development Program. Phase I. Clinical Testing.
AD-A148 919/4/GAR *514,639*

JOHNSON, J. T.
Conference Proceedings of Operational Loads Data Held at Sienna, Italy on 2-6 April 1984,
AD-A149 025/9/GAR *514,329*

JOHNSON, K. I.
Bivalve Fouling of Nuclear Power Plant Service-Water Systems. Volume 1. Correlation of Bivalve Biological Characteristics and Raw-Water System Design,
NUREG/CR-4070-V1/GAR *514,732*

JOHNSON, L. L.
Scientific and Technical Information Transfer: Issues and Options,
PB85-150357/GAR *514,437*

JOHNSON, N. J.
Tough Composite Materials.
N85-12941/9/GAR *514,973*

JOHNSON, P. N.
USAWC (United States Army War College) Military Studies Program. Soviet Merchant Marine.
AD-A148 860/0/GAR *515,172*

JOHNSON, P. S.
Pilot Program for an Automated Data Collection System.
DE84016809/GAR *515,473*

JOHNSON, R. H.
Strapdown Navigation Algorithms Implemented in the Inertial and Geographic Frames.
AD-A148 908/7/GAR *515,301*

JOHNSON, T. R.
Three-Dimensional Analysis of Heat Transfer and Gas Flow in a Radiant Furnace.
DE84011732/GAR *515,060*

JONES, C. M.
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DE85002498/GAR *515,554*

JONES, E.
Private Sector Evaluation: The Dominican Republic.
PB85-140135/GAR *514,470*

JONES, G. R.
Magnet Cold Mass High Load Supports Thermal Response and Performance Design Correlation.
DE85000964/GAR *515,318*

JONES, R. F.
Evaluation of Modifications to the Mastin Double-Envelope House.
DE85002786/GAR *514,913*

JORGENSEN, C. C.
Development of Methods for Nuclear Power Plant Personnel Qualifications and Training.
DE85002559/GAR *514,529*

JORY, H. R.
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Varian Gyrotron Development Program.
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JOY, M.
Far-Infrared Photometry of Compact Extragalactic Sources: OJ 187 and BL Lac.
N85-13701/6/GAR *514,389*

JOYNER, W. R.
Soil Sampling Apparatus.
PAT-APPL-6-837 241/GAR *514,780*

JU, F. D.
Antiplane Cracks in Solid Propellants,
AD-P004 344/8/GAR *515,699*

JUHASZ, A. A.
Effects of Perforation L/D Ratio and Slotting on Stick Propellant Combustion.
AD-A148 854/3/GAR *515,490*

JUNDE, L.
Piezoelectric Stress Transducer Used for Measurements of Explosions in Herd Rock.
DE85000300/GAR *515,509*

JURACH, P. J.
Long Span Bridge Deflections.
PB85-138683/GAR *515,192*

JURAS, R. C.
Status Report on the ORNL (Oak Ridge National Laboratory) 25 URC Accelerator.
DE85002498/GAR *515,554*

JZY, W.
Organ-Pipe Oscillation.
N85-13199/3/GAR *515,178*

KALIBJIAN, R.
Approaches to Ultrafast Neutron Detectors.
DE85001206/GAR *515,347*

KALIMULLAH,
Analytical Formula for Fuel Particle to Liquid Sodium Heat Transfer.
DE84014734/GAR *515,432*

KALKOFEN, W.
Time Dependent Effects at the Foot of the Chromosphere.
N85-13762/8/GAR *514,401*

KALLFELZ, J. M.
Flux Synthesis for the on-Line Surveillance of Nuclear Power Plants.
DE85000928/GAR *515,485*

KAM, F. B. K.
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KANG, H.
Versatile CAMAC Power Supply Controller-Monitor with Built-in Ramping and Ripple Monitor.
DE85002686/GAR *515,210*

KANNBERG, L. D.
Underground Pumped Hydroelectric Storage.
DE85000288/GAR *514,953*

KAPFER, C.
Expression of Lipopolysaccharide 0 Antigen in Escherichia coli K-12 Hybrids Containing Plasmid and Chromosomal Genes from Shigella dysenteriae 1.
AD-A148 942/6/GAR *514,580*

KARCH, N. J.
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KARLSSON, T.
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KARON, S. L.
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KATZ, T. J.
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Mejoramiento de Arroz (Rice Improvement),
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KAWAMOTO, M.
Color-Liquid-Crystal Display for Automotive Instrument Panel,
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KAYSER, R. F.
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KEETON, L. W.
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KEY, T. S.
Utility-Interactive Photovoltaic Power Conditioning Technology in the United States.
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Data Base Development for Ship Readiness Analyses.
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KING, W. T.
Technique for Reduction of Coherence Function Bias Error.
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KINOSHITA, G. S.
Accelerated Aging of Aluminized Acrylic Solar Mirror Materials.
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KINOSHITA, M.
Color-Liquid-Crystal Display for Automotive Instrument Panel,
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KIRBY, L. J.
In Situ gamma-Ray Spectrometric Analysis of Radionuclide Distributions at a Commercial Shallow Land Burial Site.
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KIRKBY, J.
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KLICKMAN, A. E.
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KNEE, H. E.
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KOETZ, J.
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KOLB, B.
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Evaluation of Automated Decisionmaking Methodologies and Development of an Integrated Robotic System Simulation.
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First-Wall and Limiter Conditioning in TFTR.
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DE85002721/GAR *515,559*

KRIER, H.
Transition to Detonation from Rapid-Compression (Ramp-Waves) Generated in a Burning Porous Bed,
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KRISHNA, C. M.
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KRON, N. F.
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KRONHAMN, T.
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KROTHAPALLI, A.
Study of Flow Past an Airfoil with a Jet Issuing from Its Lower Surface.
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KUBO, M. M.
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KUO, K. K.
Recovery of Damaged Solid Propellants by Interrupting Burning and Crack-Propagaton Processes,
AD-P004 343/0/GAR 515,698

KURY, J.
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AD-P004 349/7/GAR 515,701

LADELL, L.
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LADINSKY, H.
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LAGO, A. M.
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PB85-145134/GAR 515,111

LAMB, J. C.
Di(n-Butyl) Phthalate: Reproduction and Fertility Assessment in CD-1 Mice When Administered in the Feed.
PB85-144798/GAR 514,673

LAMBERT, O.
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N85-12862/7/GAR 514,318

LANDFERMANN, H.
Preparation of Sinter-Active Silicon Carbide Powders.
N85-12962/3/GAR 514,978

LANGAM, N. N.
Technology Change in the Philippine Agricultural Machinery Industry,
PB85-141695/GAR 514,365

LANGER, W. D.
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LANGFORD, D. A.
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LASRY, J. M.
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PB85-137354/GAR 514,371

LAUFFER, J. P.
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LAWLESS, J. L.
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LAWSON, M. B.
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LE LANN, G.
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LE MEUR, A.
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PB85-140903/GAR 515,540

LEACHMAN, C. A.
Financial Leverage Potential of Local Currency Proceeds Generated from the Food for Peace Program to Stimulate Private Enterprise in Developing Countries,
PB85-143097/GAR 514,481

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LEE, E. L.
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Reactive Sintering of SiC.
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LEE, W. H.
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LEE, Y. H.
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Unified Method for Evaluating Real-Time Computer Controllers: A Case Study,
N85-13478/1/GAR 514,342

LEINING, R. B.
Preventing Explosive Propagation in Racks or Containers of Tactical Missiles,
AD-P004 342/2/GAR 515,275

LEINWEBER, G.
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LESSER, V.
Design of a Knowledge-Based Fault Detection and Diagnosis System,
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LESSER, V. R.
Coordination in a Distributed Problem Solving Network,
AD-A148 925/1/GAR 514,425

A Debugging Tool for Distributed Systems.
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Distributed Vehicle Monitoring Testbed: A Tool for Investigating Distributed Problem Solving Networks,
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Distributing a Distributed Problem Solving Network Simulator,
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Functionally Accurate, Cooperative Distributed Systems.
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Meta-Level Control through Fault Detection and Diagnosis,
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Use of Meta-Level Control for Coordination in a Distributed Problem Solving Network,
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LESSLEY, S. D.
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LESTER, L. N.
Array Processor Utilisation in the Computation of Real-Time Images.
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LETICHE, M.
Bruit Robinet/Fluctuations de Pression. Etude du Comportement Acoustique des Equipments Hydrauliques du Batiment en Fonction de la Temperature (Tap Noise-Pressure Fluctuations. Study of the Acoustic Behavior of Hydraulic Equipment in Buildings as a Function of the Temperature).
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LEVELT SENGERS, J. M. H.
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LEVINE, L.
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LEVUSH, B.
Free Electron Laser with a Rotating Quadrupole Wiggler.
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LEWIS, P. A. W.
Modelling and Residual Analysis of Nonlinear Auto-Regressive Time Series in Exponential Variables.
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LI, B. L.
Some Addition and Complexation Reactions of a Silylated Amino(Methylene)Phosphine.
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LIANG, D. F.
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LIMA, P. M.
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LIN, S.
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LIND, M.
Dynamic Decision Making.
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LINHOLM, L. W.
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LINTZ, C.
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PATENT-4 485 747 *515,090*

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MIYAZONO, C.
Software Used with the Flux Mapper at the Solar Parabolic Dish Test Site.
N85-13376/7/GAR 514,921

MIZUNOYA, K.
Color-Liquid-Crystal Display for Automotive Instrument Panel.
PB85-149557/GAR 515,142

MOELLENBRUCK, W.
Mathematical Models for the Boiling Diagram of the Ideal Two-Component Mixture.
N85-13000/3/GAR 514,701

MOHR, D.
Unprotected Loss-of-Heat Sink Simulation in the EBR-II Plant.
DE84009630/GAR 515,428

MOLANDER, P.
Dimensionering och Finansiering av Gemensamma Resurser (Supply and Financing of Common Resources).
PB85-145910/GAR 514,486

MONTGOMERY, D. R.
Ocean Services User Needs Assessment. Volume 1. Survey Results, Conclusions and Recommendations.
N85-13445/0/GAR 514,447

MOORE, J. R.
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N85-13002/9/GAR 514,703

MORAN, E. E.
Monoclonal Antibodies to Serotype 2 and Serotype 15 Outer Membrane Proteins of Neisseria meningitidis and Their Use in Serotyping.
AD-A148 970/7/GAR 514,581

MOREL, F. M. M.
Ponding of Effluents from Fossil Fuel Steam Electric Power Plants.
PB85-144244/GAR 515,106

MORGENSTERN, M. H.
Development, Use and Control of Maintenance Procedures in Nuclear Power Plants: Problems and Recommendations.
NUREG/CR-3817/GAR 515,365

MORIG, R. D.
Resource Management: A Prioritization Process.
AD-A149 073/9/GAR 514,523

PERSONAL AUTHOR INDEX

MORLEY, B. M.
Observational Study of Transport in the Free Troposphere.
PB85-144145/GAR *515,104*

MORRISON, G.
Thermodynamic Properties of Isobutane-Isopentane Mixtures from 240 to 600K and up to 20 MPa (with Supplemental Tables from -40 to + 600F and up to 1000 psia).
PB85-154581/GAR *514,725*

MORRISON, R. K.
Ovipositional Stimulant for Trichogramma Spp.
PATENT-4 484 539 *514,602*

MORSE, D. E.
Leadership: Structural and Functional Aspects.
AD-A149 096/0/GAR *514,547*

MORTON, J. F.
Pigeonpeas (Cajanus cajan Millisp.): A Valuable Crop of the Tropics.
PB85-143105/GAR *514,375*

MOSES, E. I.
Review of AVLIS Technology for Production-Scale LIS Systems and Construction.
DE85002002/GAR *515,338*

MOULARD, H.
Etude, par la Methode de Coin, de la Composition B2141 (SNPE): Correlation entre l'Amorcabilite et la Formulation d'un Explosif a Liant Plastique (Wedge-Technique Investigation of Composite Explosive B2141 (SNPE). Correlation between Ignitability and Formation of an Explosive with Plastic Bond).
PB85-141596/GAR *515,502*

MUDAHAR, M. S.
Energy and Fertilizer: Policy Implications and Options for Developing Countries.
PB85-144301/GAR *514,367*

MUELLER, B.
Singularitaeten-Modell Zur Analyse der Wandinterferenz in Geschlossenen Windkanalen Nach der Wanddrucksignatur-Methode (Blockierung und Auftrieb) (Singularity Model for the Analysis of Wall Interference in Closed Wind Tunnels According to the Wall Pressure Signature Method (Blockage and Lift)).
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Wandeinfluss-Korrekturen in Windkanaelen: Blockierungskorrektur Nach der Wanddrucksignatur-Methode (Wall Influence Corrections in Wind Tunnels: Blockage Correction According to the Wall Pressure Signature Method).
N85-12875/9/GAR *515,215*

MUELLER, S. E.
Contingency Analysis for Construction Estimate.
DE84016252/GAR *515,195*

MUELLER, W. J. C.
Development and Testing of Thin Film Cells for High Temperature Water Vapor Electrolysis.
N85-13001/1/GAR *514,702*

MUIR, D. W.
Compact Approach to Monitored Retrievable Storage of Spent Fuel.
DE85002345/GAR *515,409*

MUKERJEE, T.
Analysis of Physical-Chemical Processes Governing SSME Internal Fluid Flows.
N85-12859/3/GAR *515,696*

MULCAHY, T. M.
Leakage-Flow-Induced Vibration of a Tube-in-Tube Slip Joint.
DE84007301/GAR *515,427*

MUNJAL, P. K.
Investment Evaluation of Solar Thermal Enhanced Oil Recovery (STEOR) Systems for Project Starts in the Years 1982 and 1986.
DE85002164/GAR *514,762*

Oil Field Data and Industry Opinions Important to the Commercialization of Solar Thermal Enhanced Oil Recovery.
DE85002153/GAR *514,760*

MUNRO, J. M.
Reducing Pollutant Emissions by Fines Removal.
PATENT-4 485 747 *515,090*

MURPHY, P. W.
Laser Program Annual Report 1983.
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MURPHY, R. D.
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AD-A148 897/2/GAR *515,491*

MURPHY, T. A.
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MURPHY, T. P.
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DE85000617/GAR *514,443*

MURRAY, B.
Mars Polar Volatiles: Topographic and Geologic Setting.
N85-13706/1/GAR *514,385*

MURRAY, R. H.
Ethics and the Army Officer: An Assessment and Recommendations for the Future.
AD-A148 949/1/GAR *514,517*

MYERS, C.
Object-Oriented Signal Processing Environment: The Knowledge-Based Signal Processing Package.
AD-A148 963/2/GAR *514,809*

NAAB, K. N.
Effects of Side Impact Padding on Driver Performance.
PB85-136372/GAR *515,129*

NAGARAJA, K. S.
Flutter Parametric Studies of Cantilevered Twin-Engine-Transport Type Wing with and Without Winglet. Volume 1: Low-Speed Investigations.
N85-13269/4/GAR *514,339*

Flutter Parametric Studies of Cantilevered Twin-Engine Transport Type Wing with and Without Winglet. Volume 2: Transonic and Density Effect Investigations.
N85-13270/2/GAR *514,340*

NAGY, A.
Safety Assessment for the RF Test Facility.
DE84017063/GAR *515,310*

NANSTAD, R. K.
Direct Comparison of Unloading Compliance and Potential Drop Techniques in J-Integral Testing.
DE85001550/GAR *514,988*

Effect of Temperature on the Stress-Relaxation Response of a Pressure Vessel Steel.
NUREG/CR-3728/GAR *514,989*

NASSERSHARIF, B.
Interfacing Systems Loss-of-Coolant Accident in Oconee-1 Pressurized Water Reactor.
DE85000175/GAR *515,496*

NASTROM, G. D.
Equations and Algorithms for Meteorological Applications in Air Weather Service.
AD-A148 894/9/GAR *514,410*

NATHANSON, N.
Mechanisms of Bunyavirus Virulence: A Genetic Approach.
AD-A149 058/0/GAR *514,635*

NEBEKER, A. V.
Biological Methods for Determining Toxicity of Contaminated Freshwater Sediments to Invertebrates.
PB85-144103/GAR *514,672*

Effects of Copper, Nickel and Zinc on the Life Cycle of the Caddisfly 'Clistoronia magnifica' (Limnephilidae).
PB85-144111/GAR *514,573*

NEGAS, T.
Process of Synthesizing Mixed BaO-TiO2 Based Powders for Ceramic Applications.
PAT-APPL-6-671 539/GAR *514,963*

NEHRING, U.
Model Equations Describing Unsteady Fluid Motion.
N85-13194/4/GAR *515,533*

NEILSON, R. H.
Some Addition and Complexation Reactions of a Silylated Amino(Methylene)Phosphine.
AD-A149 042/4/GAR *514,683*

Synthesis of Some Highly Silylated Aminophosphines and Their Reactions with Carbon Tetrachloride.
AD-A149 066/3/GAR *514,684*

NEITZEL, D. A.
Bivalve Fouling of Nuclear Power Plant Service-Water Systems. Volume 1. Correlation of Bivalve Biological Characteristics and Raw-Water System Design.
NUREG/CR-4070-V1/GAR *514,732*

NELSEN, B. H.
Long Span Bridge Deflections.
PB85-139683/GAR *515,192*

NELSON, B. E.
Design Description of the Vacuum Vessel for the Advanced Toroidal Facility.
DE85002561/GAR *515,332*

NELSON, D. E.
Combat Battle Damage Assessor Expert System.
AD-A148 898/0/GAR *515,268*

NELSON, W. J.
Structural Geology of Southeastern Illinois and Vicinity.
NUREG/CR-4036/GAR *514,744*

NEMETH, M. P.
Buckling Analysis for Rectangular Orthotropic Plates with Centrally Located Cutouts.
N85-13268/6/GAR *515,578*

NEMETH, Z. A.
Guidelines for Left-Turn Treatments at Signal Controlled Intersections.
PB85-144327/GAR *515,108*

NERI, D. F.
Guidelines for the Use of Color in SUBACS (Submarine Advanced Combat System) A Displays.
AD-A148 924/4/GAR *514,504*

Individual Differences in Chromatic Brightness Matching.
AD-A148 882/4/GAR *515,549*

NETTLES, W. C.
Ovipositional Stimulant for Trichogramma Spp.
PATENT-4 484 539 *514,602*

NEUMANN, P. H.
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PB85-136246/GAR *514,536*

NEWBY, R. A.
Particulate Emissions and Control in Fluidized-Bed Combustion: Modeling and Parametric Performance.
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NEWMAN, R. A.
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NEY, E. J.
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NGUYEN, D. H.
Modeling of Core Debris-Sodium-Concrete Interactions.
DE85000076/GAR *515,375*

NICHOLSON, W. L.
Influence of Individual Reflections on the Precision of Parameter Estimates in Least Squares Refinement.
DE85000830/GAR *515,521*

NIEDENZU, K.
Boron Derivatives of 3-Methylpyrazole.
AD-A148 980/6/GAR *514,682*

Structures of Three Pyrazaboles: 1,3,5,7-Tetramethylpyrazabole; 4,4-Bis(pyrazol-1'-yl)pyrazabole; 4,4,8,8-Tetrakis(pyrazol-1'yl)pyrazabole.
AD-A148 995/4/GAR *514,687*

NIEDENZU, P. M.
Boron Derivatives of 3-Methylpyrazole.
AD-A148 980/6/GAR *514,682*

NIEDERLEHNER, B. R.
Effects of Cadmium on the Population Growth of a Benthic Invertebrate Aeolosoma Headleyi (Oligochaeta).
PB85-144079 *514,671*

NIELSON, K. K.
Predicting Long-Term Moisture Contents of Earthen Covers at Uranium Mill Tailings Sites.
DE85000777/GAR *515,392*

NILSSON, S.
Digital Radio Link: Wave Propagation Measurements Using Narrow Band Technique.
N85-13152/2/GAR *515,291*

NISBET, I. C. T.
Review and Evaluation of the Evidence for Cancer Associated with Air Pollution.
PB85-142016/GAR *514,670*

NIX, R. G.
Hydrogen from Solar Energy.
DE85001914/GAR *515,633*

NOBRE, P.
Fontes de Calor Nos Tropicos E Escoamentos Anoma Los de Larga Escala Associadas COM Anomalias de Precipitacao No Nordeste Do Brasil (Heat Sources in the Tropics and Large Scale Flow Anomalies Associated with Precipitation Anomalies in Northeast Brazil).
N85-13421/1/GAR *514,414*

NOERSKOV, J. K.
Vibrational Excitation, Harpooning, and Sticking in Molecule-Surface Collisions.
PB85-151603 *514,719*

NOETH, H.
Structures of Three Pyrazaboles: 1,3,5,7-Tetramethylpyrazabole; 4,4-Bis(pyrazol-1'-yl)pyrazabole; 4,4,8,8-Tetrakis(pyrazol-1'yl)pyrazabole.
AD-A148 995/4/GAR *514,687*

NORD, A. R.
Mini-Modal Testing of Wind Turbines Using Novel Excitation.
DE85000666/GAR *514,902*

NORTHINGTON, D. J.
Standard Operating Procedures for Conducting Sampling and Sample Bank Audits.
PB85-143279/GAR *515,238*

NOVAK, G.
Detection of Submillimeter Polarization in the Orion Nebula.
N85-13700/8/GAR *514,368*

NOWAK, E. J.
Diffusion of Plutonium in Compacted, Brine-Saturated Bentonite.
DE85002440/GAR *515,413*

NUNZIATO, J. W.
Thermal-Mechanical Model of Deflagration-to-Detonation in Granular Energetic Materials,
AD-P004 346/3/GAR 515,593

NYHAN, J. W.
Distribution of Radionuclides and Water in Bandelier Tuff Beneath a Former Los Alamos Liquid Waste Disposal Site after 33 Years.
DE85001406/GAR 515,402

O'BRIEN, D. E.
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AD-A149 035/8/GAR 514,664

O'CONNELL, P. E.
Water Quality Modelling, Forecasting and Control,
PB85-139434/GAR 515,095

O'GRADY, W. E.
Fuel Cell Reaction in Super Acid Electrolytes.
PB85-155976/GAR 514,726

O'HARA, F. M.
Sourcebook: Gaining Access to US Government Information on the Environment and Natural Resources.
DE84017419/GAR 514,442

O'HARA, L.
Sourcebook: Gaining Access to US Government Information on the Environment and Natural Resources.
DE84017419/GAR 514,442

O'KEEFE, M. A.
Electron Image Simulation: A Complementary Processing Technique.
DE85000685/GAR 515,520

O'KEEFFE, D. J.
Guidelines for Predicting the Effects of Underwater Explosions on Swimbladder Fish.
AD-A148 870/9/GAR 515,505

O'LOUGHLIN, J. M.
Generalized Multidemensional Propagation Velocity Equations for Pool-Boiling Superconducting Windings.
DE85000926/GAR 514,786

Vapor Cooled Lead and Stacks Thermal Performance and Design Analysis by Finite Difference Techniques.
DE85001038/GAR 515,319

OBENSHAIN, F. E.
Large Acceptance Spectrometers for pi exp 0 Mesons.
DE85002472/GAR 515,357

OERNHAGEN, H.
Experiments with Hydrox at 1.3 Mpa (13 ATM).
N85-13471/6/GAR 514,622

OESTMARK, H.
Laser for Determining the Ignition Conditions of a Pyrotechnic Mixture.
N85-13230/6/GAR 515,598

OHTSUKA, T.
Transistorized Inverter and Examples of Its Application,
PB85-149540/GAR 514,949

OLIKER, V.
New Methods for Numerical Solution of One Class of Strongly Nonlinear Partial Differential Equations with Applications in Hydrodynamics.
AD-A149 026/7/GAR 515,023

OLIVER, B. F.
Modeling for Ultrasonic Nondestructive Evaluation or Columnar Structures in Anisotropic Materials. Progress Report.
DE85000435/GAR 515,518

OLSEN, C. S.
Particulate and Gas Release from Light-Water-Reactor (LWR) Fuel Rods Stored in Inert and Dry Air Atmospheres.
NUREG/CR-4056/GAR 515,420

OLSON, W. E.
AirLand Battle Execution -- Some Implications of Deep Attack.
AD-A148 948/3/GAR 515,269

OLSON, W. S.
Restoration of Multichannel Microwave Radiometric Images.
N85-13527/5/GAR 514,830

OMA, K. H.
In Situ Vitrification Pilot-Scale Radioactive Test.
DE85002671/GAR 515,416

OSBORNE, M. F.
Iodine Sorption/Desorption from Low-Alloy Steel and Graphite. Draft.
DE85000968/GAR 515,477

OSOBA, J. S.
Enhanced Recovery of Oil from Subsurface Reservoirs with Carbon Dioxide. Final Report.
DE85000109/GAR 514,759

OSTWALD, R.
Investigation and Development of Multicolored Liquid Crystal Display Systems for Automotive Dashboard Application and Large Format Information Boards.
N85-13652/1/GAR 515,128

OTTINGER, C. A.
Coolability of UO sub 2 with Downward Heat Removal: The D10 Experiment.
DE84017007/GAR 515,374

OTTO, D.
Noise Emission of Technical Diffusion Flames in Dependence of Mixing Parameters, Burner Dimensions and Air Preheating for Fuel Gases with Different Flame Velocities.
DE84770498/GAR 515,595

OUSSET, Y.
Deformations Non-Lineaires et Flambage Statique Lineaire de Structures Soumises a des Forces de Pression (Nonlinear Deformation and Static Linear Buckling of Structures under Pressure).
N85-13281/9/GAR 515,581

OWEN, A. B.
Smoothing with Split Linear Fits,
AD-A149 032/5/GAR 515,024

OWENS, S. F.
Analysis of Physical-Chemical Processes Governing SSME Internal Fluid Flows.
N85-12859/3/GAR 515,696

OWENS, T. W.
Standard Operating Procedures for Conducting Sampling and Sample Bank Audits,
PB85-143279/GAR 515,238

PACE, J. V.
Sulfur Activation in Electric Pole Insulators in Hiroshima.
DE85001169/GAR 515,266

PAGE, T. L.
Bivalve Fouling of Nuclear Power Plant Service-Water Systems. Volume 1. Correlation of Bivalve Biological Characteristics and Raw-Water System Design,
NUREG/CR-4070-V1/GAR 514,732

PAINE, B. M.
Ion Beam Mixing: Basic Experiments.
DE85002763/GAR 515,560

PAINTER, T. R.
Multi-Pattern Low-Tension Demonstration Flood, Big Muddy Field. Technical Progress Report, July-September 1984.
DE85002157/GAR 514,761

PANAYOTOU, N. F.
Design and Use of Nonstandard Tensile Specimens for Irradiated Materials Testing.
DE85001071/GAR 514,987

PANCHAL, C. B.
Theoretical Analysis of Condensation in the Presence of Noncondensable Gases as Applied to Open Cycle OTEC Condensers.
DE84015809/GAR 514,879

PANDOLF, K. B.
Skeletal Muscle Metabolism during Exercise is Influenced by Heat Acclimation,
AD-A148 845/1/GAR 514,658

PANG, K. P.
Orientation of Hydroquinone and Benzoquinone Adsorbed on Platinum Electrodes: Studies by Reflection-Adsorption Infrared Spectroscopy.
AD-A149 011/9/GAR 514,688

PANZIERI, F.
Communication System Supporting Large Datagrams on a Local Area Network.
PB85-139798/GAR 514,834

Communications Protocols for Local Area Networks.
PB85-140564/GAR 514,835

PAPANEK, G. F.
Labor Markets and Industry in Egypt: Analysis and Recommendations for Employment Oriented Growth,
PB85-136968/GAR 514,466

PARFITT, G. D.
Program of Basic Research on the Preparation and Stability of Coal/Water Slurries. Quarterly Report.
DE85003172/GAR 514,766

PARISI, B.
Co-Production of Gas and Water, Third Year.
PB85-156974/GAR 514,769

PARKER, J. L.
Use of Calibration Standards and the Correction for Sample Self-Attenuation in gamma-Ray Nondestructive Assay.
DE85002347/GAR 515,339

PARKINSON, W. H.
Absolute Transition Probabilities of Lines in the Spectra of Astrophysical Atoms, Molecules, and Ions.
N85-13705/7/GAR 514,393

PARKS, C. V.
SCALE: A Modular Code System for Performing Standardized Computer Analyses for Licensing Evaluation - Additions and Revisions.
NUREG/CR-0200-REV 2/GAR 515,481

PARMENTIER, T. J.
Definition of Technology Development Missions for Early Space Station Satellite Servicing. Volume 2. Technical.
N85-12923/7/GAR 515,708

PARTHASARATHY, R.
Heavy Oil Processing Utilizing the Dynacracking Process. Final Report.
DE85000176/GAR 515,613

PASHINSKI, D. J.
Tidal Phase Control of Sediment Discharge from the Yangtze River.
AD-A148 876/6/GAR 514,735

PATCHING, C. A.
Long Term Durability of Urea Formaldehyde Glued Joints Removed from Vampire Aircraft.
AD-A149 053/1/GAR 514,332

PATTEIN, J.
Plaques Polyurethannes pour Blindages Transparents (Polyurethane Plates for Transparent Blinding),
PB85-144525/GAR 515,510

PATTON, J. F.
Assessment of Muscle Strength and Prediction of Lifting Capacity in U.S. Army Personnel,
AD-A148 846/9/GAR 514,659

PATTON, R. J.
Ocean Services User Needs Assessment. Volume 1. Survey Results, Conclusions and Recommendations.
N85-13445/0/GAR 514,447

PAULSON, A. E.
Impact of the AT and T (American Telephone and Telegraph) Divestiture on the Strategic Air Command.
AD-A148 957/4/GAR 515,281

PAVEL, J. R.
Some Experiences of Testing Protocol Implementations,
PB85-138345/GAR 514,832

PAVLIN, J.
Predicting the Performance of Distributed Knowledge-Based Systems: A Modeling Approach,
AD-A149 021/8/GAR 514,427

PEARSON, R. A.
Toughening Mechanism in Elastomer-Modified Epoxy Resins, Part 2.
N85-13046/6/GAR 515,018

PECK, S. D.
Vapor Cooled Lead and Stacks Thermal Performance and Design Analysis by Finite Difference Techniques.
DE85001038/GAR 515,319

PEDERSEN, D. R.
Bubble-Induced Mixing of Two Horizontal Liquid Layers with Non-Uniform Gas Injection at the Bottom.
DE85000097/GAR 515,377

Modeling of Core Debris-Sodium-Concrete Interactions.
DE85000076/GAR 515,375

PEDERSON, B.
H8-1 and H8-2 Cataloging Handbooks.
PB85-120483/GAR 514,451

PEDLOSKY, J.
On the Dynamics of the Coupled Mixed Layer-Thermocline System and the Determination of the Oceanic Surface Density.
AD-A148 968/1 514,737

PEGORARO, F.
Collective Effects in Spin Polarized Plasmas.
DE85002702/GAR 515,572

PENA, D.
Robust Kalman Filtering and Its Applications.
AD-A149 044/0/GAR 515,025

PENNER, T.
Private Sector and the Economic Development of Malawi.
PB85-140606/GAR 514,473

PEPKE, E.
Economic Analysis of Three Methods to Dry Biomass Fuels.
DE85000178/GAR 515,614

PEPPIN, R. J.
Acoustical Laboratory Accreditation Program of the United States.
PB85-151694 515,517

PERKINS, L. Z.
Dworshak Dam, North Fork Clearwater River, Idaho. Hydraulic Model Investigation.
AD-A148 864/2/GAR 515,079

PERSHING, D. W.
Reducing Pollutant Emissions by Fines Removal.
PATENT-4 485 747 515,090

PERSOFF, P.
Steam Stripping of Oil Shale Wastewaters. LBL/SEEHRL Steam Stripper: Design, Operation, and Maintenance Manual.
DE85003058/GAR 515,089

PERSSON, B. N. J.
High Resolution Electron Energy Loss Studies of Fermi-Level States of Clean and Metallized Si(111) Surfaces.
AD-A148 933/5/GAR 515,584

PETERSEN, G.
Test Field Pellworm for Wind Turbines.
DE84752110/GAR 514,882

PETERSON, C. R.
Internal Seal for Repairing Natural Gas Mains.
PB85-142685/GAR 514,957

PETERSON, D. B.
Review of Solar Fuel-Producing Quantum Conversion Processes.
DE85000336/GAR 515,617

Solar Photochemical Process Engineering for Production of Fuels and Chemicals.
DE85000335/GAR 515,616

PETERSON, K.
Co-Production of Gas and Water, Third Year.
PB85-156974/GAR 514,769

PETERSON, M. B.
Strategy for Selection of Tribological Coatings.
PB85-151686 514,986

PETERSON, T. W.
Aerosol Formation from Pulverized Coal Combustion. Quarterly Reports 1, 2 and 3.
DE85003188/GAR 515,667

PETITDEMANGE, C.
L'Analyse de la Valeur (Value Analysis).
N85-13584/4/GAR 514,463

L'Organisation de la Qualite (Quality Organization).
N85-13257/9/GAR 515,255

PETOT, D.
Application of the Onera Model of Dynamic Stall.
N85-12852/7/GAR 514,318

PETTIT, R. B.
Accelerated Aging of Aluminized Acrylic Solar Mirror Materials.
DE85002683/GAR 514,911

PFEIFER, H. J.
Possibilites d'Application de l'Anemometrie Laser a l'Etude de l'Interaction Cho/Couche Limite en Transonique (Possibilities of Applying Laser Anemometry to an Investigation of the Interaction Shock/Boundary Layer in Transonic Flight).
PB85-144533/GAR 514,327

PHILLIPS, W. P.
Space Shuttle Orbiter Trimmed Center-of-Gravity Extension Study. Volume 8: Effects of Configuration Modifications on the Aerodynamic Characteristics of the 140 a/B Orbiter at a Mach Number of 5.97.
N85-12867/6/GAR 515,712

PIAT, J. F.
Precision des Essais de 1/2 Maquettes Motorisees a S2MA (Half Powered Model Tests in the Modane Center).
PB85-141703/GAR 514,326

PICKFORD, R. D.
Drinking Water Microbiology. NATO/CCMS (Committee on the Challenges of Modern Society) Drinking Water Pilot Project Series.
PB85-144343/GAR 515,109

PIERCE, R. D.
Advanced Fuel Cell Development. Progress Report, October-December 1983.
DE85000781/GAR 514,933

PIGFORD, T. H.
Assessing the Performance of Geologic Repositories for Nuclear Waste.
DE85001197/GAR 515,399

PIHOS, G. G.
Multisensor Satellite Data Integration for Sea Surface Wind Speed and Direction Determination.
N85-13446/8/GAR 514,770

PILCHER, J. O.
Acceleration Measurements in High G Environments.
AD-A148 896/4/GAR 515,506

PINCKERT, R. E.
Conference Proceedings of Operational Loads Data Held at Sienna, Italy on 2-6 April 1984.
AD-A149 025/9/GAR 514,329

PINEL, S. I.
Effect of Two Inner-Ring Oil-Flow Distribution Schemes on the Operating Characteristics of a 35 Millimeter Bore Ball Bearing to 2.5 Million Dn.
N85-13233/0/GAR 515,165

PINGREY, D. W.
Direct Combustion Systems to Produce Power from Biomass from Wood, Forest and Agricultural Crop Residue.
PB85-137800/GAR 515,670

PIOTROWSKI, A.
Importance of Active Sites for Char Gasification in Oxygen (Air) and Carbon Dioxide.
PB85-155984/GAR 515,673

PIPER, E.
Energieuebertraage bei Atom-Molekuel-Streuexperimenten AM Beispiel der Systeme SF6-AR, CF4-Ne und Xe-CO2 im I 1 Ev-Bereich (Energy Transfer in Atom-Molecule Scattering Experiments in the 1EV Region with SF6-AR, CF4-Ne and Xe-CO2 Systems as Examples).
N85-13588/7/GAR 514,708

PITTINGER, C. A.
Effects of Cadmium on the Population Growth of a Benthic Invertebrate Aeolosoma Headleyi (Oligochaeta).
PB85-144079 514,671

PLASIL, F.
Large Acceptance Spectrometers for pi exp 0 Mesons.
DE85002472/GAR 515,357

PLEASANT, L. G.
Space Medicine Research Publications: 1983-1984.
N85-13489/0/GAR 514,586

POBGEE, P. J.
Automatic Analysis of Speckle Photographs by Microcomputer,
PB85-136378/GAR 515,235

POESCHEL, R. L.
Ion Thruster System (8-cm) Cyclic Endurance Test.
N85-12937/7/GAR 515,603

POLHAMUS, G. D.
Measurement and Prediction of Thermal Injury in the Retina of the Rhesus Monkey.
AD-A148 977/2/GAR 514,654

PONG, M. C.
I-PIGS: A Concurrent Programming Environment with Interactive Graphical Support,
PB85-140646/GAR 514,836

POOL, K. H.
Leak Detectors for Organic Rankine Cycle Power Plants: On-Line and Manual Methods.
DE85002792/GAR 514,943

PORTMAN, D. J.
Program for Solar Energy Meteorological Research and Training, Region VI. Final Report.
DE85001483/GAR 514,412

POST, E.
NO2 and Health Effects: Analysis of Selected Studies. Phase 2.
PB85-149714/GAR 514,674

POTTER, J. L.
Role of Freestream Turbulence Scale in Subsonic Flow Separation.
N85-12870/0/GAR 514,322

POUCHOT, W. D.
MHD Generator Electrode Development. Summary Report, July 1, 1981-September 30, 1982.
DE85002156/GAR 514,938

POZZORINI, R.
Vergleichende Stroemungsrechnung an Transsonischen Kegel/Zylinder-Eidhmodellen im Zusammenhang MIT Dem Wandinterferenzproblem (Comparative Flow Calculation on Transonic Cone/Cylinder Standard Models in Connection with the Wall Interference Problem).
N85-12878/3/GAR 515,218

PRATT, R. G.
Private Sector: Costa Rica.
PB85-141679/GAR 514,479

PRATT, S. T.
Resonantly Enhanced Multiphoton Ionization of Molecules.
DE85000585/GAR 514,693

PRAY, C. E.
Agricultural Research System of Pakistan: The Report of the Minnesota Reconnaissance Team,
PB85-141836/GAR 514,372

PRESTON, C. C.
Interactive and Automated Systems for Nuclear Track Measurements with Applications to Fast Neutron Dosimetry.
DE85002240/GAR 515,353

PRESTON, E. M.
Effects of SO2 on a Grassland: A Case Study in the Northern Great Plains of the United States,
PB85-137354/GAR 514,371

PRESTWICH, K. R.
High Power Pulsed Accelerators with Potential Industrial Applications.
DE85001710/GAR 515,553

PRICE, M. E.
Mirror Advanced Reactor Study (MARS). Final Report. Volume 1-A. Commercial Fusion Electric Plant.
DE85001727/GAR 515,325

Mirror Advanced Reactor Study (MARS). Final Report. Volume 1-B. Commercial Fusion Electric Plant.
DE85001729/GAR 515,327

Mirror Advanced Reactor Study (MARS). Final Report. Volume 2. Commercial Fusion Synfuels Plant.
DE85001728/GAR 515,326

PRICE, W. L.
Digital Signatures - An Update,
PB85-136337/GAR 514,831

PRINCE, E.
Influence of Individual Reflections on the Precision of Parameter Estimates in Least Squares Refinement.
DE85000830/GAR 515,521

PUGH, C. E.
Heavy-Section Steel Technology Program Semiannual Progress Report for April-September 1984,
NUREG/CR-3744-V2/GAR 515,453

PURDON, J. F. W.
Investigations of Severe/Tornadic Thunderstorm Development and Evolution Based on Satellite and AVE/Sesame/VAS Data.
N85-13424/5/GAR 514,416

PURDY, G. M.
Structure and Variability of Oceanic Crust on the Flanks of the East Pacific Rise between 11 and 13 N.
AD-A148 930/1/GAR 514,740

QUADE, J.
Mineral Inventory of the Nevada Test Site, and Portions of Nellis Bombing and Gunnery Range Southern Nye County, Nevada. Final Report.
DE85000845/GAR 514,743

QUICK, B.
Fiber Optic, Fabry-Perot High Temperature Sensor.
N85-13594/5/GAR 515,232

QUINT, B. E.
Scientific and Technical Information Transfer: Issues and Options.
PB85-150357/GAR 514,437

RACCAH, P. M.
Solar-Assisted Hydrogen Generation by Photoelectrocatalysis.
PB85-149706/GAR 514,730

RADEBAUGH, R.
Fundamentals of Alternate Cooling Systems.
PB85-151736 515,590

Very-Low-Temperature Cooling Systems.
PB85-151728 515,589

RADFORD, L. R.
Development, Use and Control of Maintenance Procedures in Nuclear Power Plants: Problems and Recommendations.
NUREG/CR-3817/GAR 515,365

RAE, J. B.
RRS FREDERICK RUSSELL Cruise 2/83, 14 January - 8 February 1983. Mooring and CTD Work Along the Continental Slope off the Hebrides and Shetland Isles,
PB85-139517/GAR 514,771

RAFFERTY, K.
College of Idaho Geothermal System, Caldwell, Idaho.
DE85002329/GAR 514,909

RAHMEL, A.
Interactions Between Corrosion and Creep of Uncoated and Coated Superalloys in Sulfate Melts.
N85-13038/3/GAR 514,995

RAIFAS, B. E.
U.S.-Flag Crosstrading. Volume 1. Executive Summary.
PB85-146553/GAR 514,488

U.S.-Flag Crosstrading. Volume 2. U.S.-Flag Crosstrading Operations and U.S. Policy Options.
PB85-146561/GAR 514,489

RAMAKER, D. E.
Characterization of Surfaces Using Electron and Photon Stimulated Desorption.
PB85-151587 514,718

RAMIREZ, V.
Study of the Cooperative Movement in Honduras,
PB85-133635/GAR 514,346

RANADIVE, A. Y.
Particulate Emissions and Control in Fluidized-Bed Combustion: Modeling and Parametric Performance.
PB85-152973/GAR 515,114

RANCE, N. E.
Modulation of the Cytosolic Androgen Receptor in Striated Muscle by Sex Steroids.
N85-13468/2/GAR 514,642

RANKA, K.
Instrumented Impact Testing Machine with Reduced Specimen Oscillation Effects.
N85-13218/1/GAR 515,227

RANKIN, R. A.
Determination of Iodine Specific Activity in Nuclear Fuel Reprocessing Plant off-Gases.
DE85000193/GAR 515,475

RASHED, O.
Molecular Dynamics Study of the Reaction: H Sub 2 + OH Yields H sub 2 O + H.
DE85000624/GAR 514,694

RASMUSSEN, O. R.
Closeout Report for the Decontamination and Decommissioning of the 203-S, 204-S, 205-S Facilities.
DE85002502/GAR 515,414

RATCLIFFE, C. A.
Portable Microdosimetry System.
DE85000841/GAR 514,655

RATIU, T.
Richardson Number Criterion for the Nonlinear Stability of Three-Dimensional Stratified Flow.
AD-A148 971/5/GAR 515,528

RATTIN, E. J.
Oil Field Data and Industry Opinions Important to the Commercialization of Solar Thermal Enhanced Oil Recovery.
DE85002153/GAR 514,760

Technical Support Services for the Solar Thermal Enhanced Oil Recovery Program. Volume 1. Program Summary Report, February 9-May 31, 1981.
DE85002165/GAR 514,763

RAVECHE, H. J.
Asymptotic Density Correlations and Corrections to Scaling for Fluids with Non-Finite-Range Interactions.
PB85-151645 515,542

RAVINDRA, M. K.
Probability of Pipe Failure in the Reactor Coolant Loops of Combustion Engineering PWR Plants. Vol. 3. Double-Ended Guillotine Break Indirectly Induced by Earthquakes.
NUREG/CR-3663-V3/GAR 515,452

REA, J. L.
Physician Evaluation of Impairment/Disability.
HRP-0906093/0/GAR 514,619

REASONER, D. J.
Heterotrophic Bacteria in Potable Water: Progress in Method Options and Monitoring Benefits,
PB85-144152/GAR 515,105

REDDY, G. N.
Summary of District Heating and Cooling Project in Moorhead, Minnesota.
DE85002608/GAR 514,940

REDER, S.
Study of English Language Training for Refugees in the United States. Phase 3: The Influence of Language Training and Employment on Adult Refugees' Acquisition of English.
SHR-0012016/GAR 514,513

REE, F.
Detonation E.O.S. Patterns for Several Explosives.
DE85001039/GAR 515,499

REED, A. W.
Coolability of UO2 Debris Beds in Pressurized Water Pools: DCC-1 and DCC-2 Experiment Results.
DE84017005/GAR 515,373

REED, D. W.
Review of British Flood Forecasting Practice,
PB85-140515/GAR 514,754

REED, S. T.
Sol-Gel-Derived AR Coatings for Solar Receivers.
DE85000192/GAR 514,896

REEL, J. R.
Di(n-Butyl) Phthalate: Reproduction and Fertility Assessment in CD-1 Mice When Administered in the Feed.
PB85-144798/GAR 514,673

REEVE, J. N.
Mistranslation of the mRNA Encoding Bacteriophage T7 0.3 Protein.
AD-A148 875/8/GAR 514,632

REEVES, M. E.
Artificial Photosynthesis with Algal and Reconstituted Systems.
DE85002557/GAR 515,660

REGINATO, L. L.
Adaptation of an Air-Dielectric RF Cable for Use as an Oil-Filled High Voltage Pulse Transmission Line.
DE84017414/GAR 514,785

REIDENAUER, J. A.
An Experimental Investigation of Enhanced Harpacticoid (Copepoda) Abundances Around Isolated Seagrass Shoots.
AD-A148 918/6/GAR 514,731

REINMUTH, K.
Development and Fabrication of Refractory Bodies for Gas Turbine Engines.
N85-12899/9/GAR 515,686

RENARDY, M.
Perturbation of a Multiple Eigenvalue in the Benard Problem for Two Fluid Layers.
AD-A149 068/9/GAR 515,529

Recent Developments and Open Problems in the Mathematical Theory of Viscoelasticity.
AD-A149 043/2/GAR 515,576

RENARDY, Y.
Perturbation of a Multiple Eigenvalue in the Benard Problem for Two Fluid Layers.
AD-A149 068/9/GAR 515,529

RESNICK, S.
More Limit Theory for the Sample Correlation Function of Moving Averages.
AD-A148 975/6/GAR 515,021

REST, J.
Steady-State and Transient Fission Gas Release and Swelling Model for LIFE-4.
DE84014730/GAR 515,421

REST, K. M.
Primer of Occupational and Environmental Medicine: A Manual for Family Physicians and Other Primary Care Physicians,
HRP-0906070/8/GAR 514,616

REVSON, J. E.
Planning Familial: Son Effet sur la Sante de la Femme et de l'Enfant (Family Planning: Its Effect on the Health of the Woman and Child),
PB85-141729/GAR 514,589

REXROTH, P. E.
Applications of the CONTAIN 1.0 Computer Code to the Analysis of Containment Loading under Severe Accident Conditions.
DE85002430/GAR 515,383

RHEINBOLDT, W. C.
Program Design for an Adaptive, Non-Linear Finite Element Solver.
AD-A148 880/8/GAR 514,802

RICE, E. W.
'Klebsiella' Occurrence, Significance and Detection in Water Systems: A Progress Report,
PB85-144160/GAR 514,636

RICE, J. B.
Mistranslation of the mRNA Encoding Bacteriophage T7 0.3 Protein.
AD-A148 875/8/GAR 514,632

RICE, R. F.
Mission Science Value-Cost Savings from the Advanced Imaging Communication System (AICS) (Advanced Imaging Communication System).
N85-12905/4/GAR 515,283

RICHARDS, L. W.
Theoretical Study of the Optical Properties of Diesel Particles.
PB85-144368/GAR 514,715

RICHARDSON, D. D.
Railgun Plasma Armature Characterisation Experiments,
AD-A149 083/8/GAR 514,784

RICHARDSON, E. G.
Status Report on the ORNL (Oak Ridge National Laboratory) 25 URC Accelerator.
DE85002498/GAR 515,554

RICKERT, P.
Actinide Separations by Supported Liquid Membranes.
DE84013462/GAR 515,386

RINTAMAA, R.
Instrumented Impact Testing Machine with Reduced Specimen Oscillation Effects.
N85-13218/1/GAR 515,227

RIPKE, M.
International Comparative Study of Systems for the Government Advancement of Research and Development.
N85-13689/3/GAR 514,500

RITTER, J. J.
Process of Synthesizing Mixed BaO-TiO2 Based Powders for Ceramic Applications.
PAT-APPL-6-671 539/GAR 514,963

ROBBINS, C.
Design of Energy-Responsive Commercial Buildings.
DE84013046/GAR 515,062

ROBBINS, F. W.
Effects of Perforation L/D Ratio and Slotting on Stick Propellant Combustion.
AD-A148 854/3/GAR 515,490

ROBERTHSON, H.
Baerandet av Last i Militaerhistoriskt och Fysiologiskt Perspektiv - En Litteraturstudie (Military History and Physiology of Load Carriage - A Survey of Literature,
PB85-145894/GAR 514,666

ROBERTS, A. G.
20-Atmosphere Rig PFBC Results: Test 20. Investigations with a Medium-Volatile Content Coal.
DE84012002/GAR 515,083

20-Atmosphere Rig PFBC Results: Tests 18 and 19. Further Investigation into Agglomerate Formation when Using Limestone as the Sorbent.
DE84012001/GAR 515,061

ROBERTS, J. H.
Interactive and Automated Systems for Nuclear Track Measurements with Applications to Fast Neutron Dosimetry.
DE85002240/GAR 515,353

ROBERTS, L.
Viscous-Inviscid Aerodynamic Analysis of Two-Dimensional Thrust Augmentors.
N85-12861/9/GAR 514,317

ROBERTS, R. M.
Solid Waste Management Options for Naval Installations on Guam.
AD-A148 947/5/GAR 515,081

ROBERTSON, D. E.
Radionuclide Migration in Groundwater - Annual Report for FY 1983.
NUREG/CR-3712/GAR 515,423

ROBERTSON, J. M.
Land Treatment of Petroleum Refinery Sludges.
PB85-148708/GAR 515,112

ROBERTUS, R. J.
Leak Detectors for Organic Rankine Cycle Power Plants: On-Line and Manual Methods.
DE85002792/GAR 514,943

Special Function Instruments for Binary Cycle Geothermal Power Plants.
DE85003109/GAR 514,915

ROBINSON, A. C.
Asymptotic Formulas for the Motion of Shaped Charge Liners.
DE85000197/GAR 515,498

ROBINSON, C. V.
Guidelines - Design to Minimize Contamination and to Facilitate Decontamination of Military Vehicles and Other Equipment: Interiors and Exteriors.
AD-A149 088/7/GAR 515,259

ROBINSON, W. R.
Comparison of L04, L05, and L07: Three Irradiated 7-Pin Bundle TUCOP Tests.
DE84014680/GAR 515,471

ROBSON, M.
UK (United Kingdom) Industrial Energy Demand: Economic and Technical Change in the Steam Boiler Stock.
PB85-144293/GAR 514,948

ROE, P. L.
Generalized Formulation of TVD (Total Variation Diminution) Lax-Wendroff Schemes.
N85-13528/3/GAR 515,040

ROFFEY, R.
Method for Evaluating Petrol Products Corrosivity Using Piezoelectric Crystals. Part 2: Instruction Manual.
N85-13073/0/GAR 515,669

ROGERS, J. D.
Toroidal Fusion Core Experiment (TFCX) Studies.
DE84016813/GAR 515,309

ROGERS, V. C.
Predicting Long-Term Moisture Contents of Earthen Covers at Uranium Mill Tailings Sites.
DE85000777/GAR 515,392

ROGERSON, J. E.
Hydrodynamic Response of a Radiating Al Plasma Excited by a Proton Beam.
AD-A148 904/6/GAR 515,568

ROME, J. A.
Calculation of Stellarator Equilibria in Vacuum Flux Surface Coordinates.
DE85001693/GAR 515,322

RONNINGEN, L. A.
Modelling, Implementation and Use of a Traffic Simulator for NPDN (Nordic Public Data Network),
PB85-140838/GAR 515,292

ROONEY, D.
Creep Characterization of a Type 316 Austenitic Steel,
PB85-139665/GAR 515,001

ROSA, R. A.
Study of the Cooperative Movement in Honduras,
PB85-133635/GAR 514,346

ROSENBAUM, J. G.
Geological and Geophysical Evidence of Structures in Northwest-Trending Washes, Yucca Mountain, Southern Nevada, and Their Possible Significance to a Nuclear Waste Repository in the Unsaturated Zone.
DE85002656/GAR 515,415

ROSENEAU, G.
Formats for Numerical and Textual Data in Data Processing.
N85-13504/4/GAR 514,826

ROSS, H. P.
Hill AFB, Utah Installation Restoration Program. Phase IIB, IRP Survey. Volume 1. Text. Volume 2. Appendices.
AD-A149 013/5/GAR 514,742

ROSS, R. T.
Limitations on the Efficiency of the Solar Photoreduction of Carbon.
PB85-151330/GAR 514,717

ROSSI, S. M.
Solar Energy System Case Study, Oakmead Industries, Santa Clara, California.
DE85002078/GAR 515,069

ROSSING, B. R.
MHD Generator Electrode Development. Summary Report, July 1, 1981-September 30, 1982.
DE85002156/GAR 514,938

ROTH, E. B.
Windows for Innovation: A Story of Two Large-Scale Technologies,
PB85-150340/GAR 515,294

ROTH, H. D.
NO2 and Health Effects: Analysis of Selected Studies. Phase 2.
PB85-149714/GAR 514,674

ROTH, R. S.
Process of Synthesizing Mixed BaO-TiO2 Based Powders for Ceramic Applications.
PAT-APPL-6-671 539/GAR 514,963

ROTHFELD, A. F.
Effect of Ventilation and Perfusion Imbalance on Inert Gas Rebreathing Variables.
PB85-144087 514,650

PERSONAL AUTHOR INDEX

ROUGHAN, J. L.
Study of the Requirements of an Electronic Message Handling Facility.
AD-A149 067/9/GAR *514,819*

ROUSH, J. L.
Private Sector: The Tortoise Walk. Public Policy and Private Activity in the Economic Development of Cameroon.
PB85-143048/GAR *514,480*

RUBIN, T. D.
Ambient Monitoring of Pollutants Around Synfuel Plants.
PB85-142701/GAR *515,100*

RUDDY, F. H.
Interactive and Automated Systems for Nuclear Track Measurements with Applications to Fast Neutron Dosimetry.
DE85002240/GAR *515,353*
Standardized Physics-Dosimetry for US Pressure Vessel Cavity Surveillance Programs.
DE85002236/GAR *515,444*

RUFER, M. L.
Laser Program Annual Report 1983.
DE84017287/GAR *515,311*

RUFF, A. W.
Strategy for Selection of Tribological Coatings.
PB85-151686 *514,966*

RUGGIERI, S. K.
York Canyon Mine Evaluation. Monthly Technical Progress Report No. 39, October 1-31, 1984.
DE85002322/GAR *514,765*

RUHL, M. J.
Design Report on the Atmospheric Fluidized Bed Combustor at the Kentucky Center for Energy Research Laboratory.
PB85-136915/GAR *515,092*

RUSSELL, J. A.
Opportunities for Energy Conservation Through Biotechnology.
DE85002660/GAR *515,661*

RUST, S.
Evaluation of Cryogenic Trapping As a Means for Collecting Organic Compounds in Ambient Air.
PB85-144046/GAR *515,239*

RYSSEL, H.
Ion Beam Lithography.
N85-13219/9/GAR *515,151*

RYZNAR, E.
Program for Solar Energy Meteorological Research and Training, Region VI. Final Report.
DE85001483/GAR *514,412*

SACKINGER, P. A.
Separation of Helium-Methane Mixtures by Single-Column Pressure Swing Adsorption.
DE85002785/GAR *514,699*

SAHAR, G.
Planning of Minimum-Time Trajectories for Robot Arms.
AD-A148 956/8/GAR *515,162*

SAKAJI, R. H.
Steam Stripping of Oil Shale Wastewaters. LBL/SEEHRL Steam Stripper: Design, Operation, and Maintenance Manual.
DE85003058/GAR *515,089*

SALAMA, K.
Nondestructive Evaluation of Residual Stress in Low-Carbon Steel.
N85-13284/5/GAR *514,997*

SALAMON, D.
Note on the Disturbance Decoupling Problem for Retarded Systems.
AD-A149 045/7/GAR *515,028*

SALAS, M. D.
Local Stability Analysis for a Planar Shock Wave.
N85-12864/3/GAR *515,530*

SALINGER, R.
Determining the Need for Training: A Collection of Federal Agency Needs Assessment Practices.
PB85-144606/GAR *514,538*

SALLAM, M. S.
Population Growth and Development in Egypt: Farmers' and Rural Development Officials' Perspectives.
PB85-141681/GAR *514,350*

SAMMELLS, A. F.
Solar-Assisted Hydrogen Generation by Photoelectrocatalysis.
PB85-149706/GAR *514,730*
Two Photoelectrode Solid-State Photoelectrochemical Cell.
AD-A148 982/2/GAR *514,686*

SAMMON, N. P.
High Resolution Computed Tomography for Solid Modeling and Computer Aided Design.
DE85000085/GAR *515,147*

SANDBORG, A.
Comparison of XEDS and EELS Using Conventional Beryllium Window and Windowless Detectors.
DE85002734/GAR *515,212*

SANDERSON, E. W.
Public Groundwater Supplies in Will County.
PB85-139550/GAR *514,753*

SAROHIA, V.
Experimental Investigation of Two-Dimensional Thrust Augmenting Ejectors, Part 1.
N85-12894/0/GAR *515,684*
Experimental Investigation of Two-Dimensional Thrust Augmenting Ejectors, Part 2.
N85-12895/7/GAR *515,685*

SAUCIER, R. T.
Selected Geologic Literature Lower Mississippi Valley Division Area Index and Annotated Bibliography. Supplement 6.
AD-A148 945/9/GAR *514,741*

SAUERMANN, H.
Development of Components for Micro-C Oriented Sensor Systems.
N85-13215/7/GAR *515,224*

SAUERS, I.
Spark Decomposition of SF sub 6 ; Toxicity of by-Products.
DE85000161/GAR *514,692*

SAVONEN, C.
Effects of Copper, Nickel and Zinc on the Life Cycle of the Caddisfly 'Cistronia magnifica' (Limnephilidae).
PB85-144111/GAR *514,573*

SAWKA, M. N.
Skeletal Muscle Metabolism during Exercise is Influenced by Heat Acclimation.
AD-A148 845/1/GAR *514,658*

SCHAEFER, H. J.
Possibilites d'Application de l'Anemometrie Laser a l'Etude de l'Interaction Cho/Couche Limite en Transsonique (Possibilities of Applying Laser Anemometry to an Investigation of the Interaction Shock/Boundary Layer in Transonic Flight).
PB85-144533/GAR *514,327*

SCHAEFER, W.
Development and Testing of Thin Film Cells for High Temperature Water Vapor Electrolysis.
N85-13001/1/GAR *514,702*

SCHAFFAR, M.
Etudes des Correlations Vitesse-Pression Acoustique Conditionnees sur le Signe et l'Amplitude de la Fluctuation de Vitesse dans UN Jet Froid (Study of the Velocity-Acoustic Pressure Correlation in a Cold Jet, Centered on the Sign and the Amplitude of the Velocity Fluctuations).
N85-13193/6/GAR *515,516*

SCHEUERMANN, C. M.
Stirling Material Technology.
N85-13007/8/GAR *515,692*

SCHIAVO-CAMPO, S.
Private Sector: The Tortoise Walk. Public Policy and Private Activity in the Economic Development of Cameroon.
PB85-143048/GAR *514,480*

SCHIERMEIER, F. A.
Scientific Assessment Document on Status of Complex Terrain Dispersion Models for EPA Regulatory Applications.
PB85-138584/GAR *515,091*

SCHILLING, R.
Improved Sensitivities in Laser Interferometers for the Detection of Gravitational Waves.
N85-13232/2/GAR *515,574*

SCHLEPP, D.
Performance of the SERI (Solar Energy Research Institute) Parallel-Passage Dehumidifier.
DE85000509/GAR *515,068*

SCHLEPP, D. R.
High Performance Solar Desiccant Cooling System: Performance Evaluations and Research Recommendations.
DE85000508/GAR *515,065*

SCHMEISER, C.
Asymptotic Representation of Solutions of the Basic Semiconductor Device Equations.
AD-A149 040/8/GAR *514,783*

SCHMIDT, J. A.
Adaptation of an Air-Dielectric RF Cable for Use as an Oil-Filled High Voltage Pulse Transmission Line.
DE84017414/GAR *514,785*

SCHMIDT, R. E.
Amphibian Chromomycosis.
AD-A148 874/1/GAR *514,567*

SCHMIDT, S. K.
Two Photoelectrode Solid-State Photoelectrochemical Cell.
AD-A148 982/2/GAR *514,686*

SCHMIDT, T. R.
Coolability of UO2 Debris Beds in Pressurized Water Pools: DCC-1 and DCC-2 Experiment Results.
DE84017005/GAR *515,373*

SCHMIELE, R.
Dynamic Stark-Effect in Thallium.
PB85-143204/GAR *514,712*

SCHMITZ, J. P.
Polyactic-Polyglycolic Acid Copolymer Combined with Decalcified Freeze-Dried Bone for Use as a Bone Repair Material.
PAT-APPL-6-858 945/GAR *514,585*

SCHNEIDER, B.
Employee and Customer Perceptions of Service in Banks: Replication and Extension.
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SCHNEIDER, H. W.
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SCHNUPP, L.
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SCHULLER, F. T.
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SCHWARTZ, J. T.
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SCOTT, W. A.
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SCRIBNER, K.
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Local Slot Boundary Condition for Transonic Flow Calculations in Slotted-Wall Test Sections of Wind Tunnels.
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SEEBAUGH, W. R.
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SEGAL, P.
Recommendations for Quality Assurance Programs in Nuclear Medicine Facilities.
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SEGALL, S. B.
Two-Stage Free Electron Laser Research.
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SEID, R. C.
Expression of Lipopolysaccharide 0 Antigen in Escherichia coli K-12 Hybrids Containing Plasmid and Chromosomal Genes from Shigella dysenteriae 1.
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SEITZ, M. G.
Mathematical Modeling and Evaluation of Radionuclide Transport Parameters from the ANL Laboratory Analog Program.
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SEKAR, R.
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SENGERS, J. V.
Semi-Automated Facilities for Measuring Density, PVT and VLE of Energy-Related Fluids.
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Integral Fast Reactor Concept.
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SHA, W. T.
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SHAFER, J. F.
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Surveillance Receiver/Recorders.
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SHANNON, D. W.
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DE85002792/GAR *514,943*

Special Function Instruments for Binary Cycle Geothermal Power Plants.
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SHAPIRO, S.
Asbestos: Expedience, Exposure, and Human Experience,
HRP-0906074/0/GAR *514,617*

SHAPLEIGH, A.
Azores Earthquake Reconstruction, January 1, 1980: A Report after Two and One Half Years,
PB85-144616/GAR *514,773*

SHARIR, M.
On the Piano Movers' Problem. V. The Case of a Rod Moving in Three-Dimensional Space Amidst Polyhedral Obstacles.
AD-A148 969/9 *515,050*

SHARP, D. S.
Assessment of Muscle Strength and Prediction of Lifting Capacity in U.S. Army Personnel,
AD-A148 846/9/GAR *514,659*

SHEN, H. T.
Tidal Phase Control of Sediment Discharge from the Yangtze River.
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SHEN, Y. R.
Optical Second Harmonic Generation for Surface Studies.
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SHENKIR, C. A.
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SHEPARD, D. S.
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SHEPHERD, K. P.
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SHIEH, D. J.
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SHIN, K. C.
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SHIN, K. G.
Unified Method for Evaluating Real-Time Computer Controllers: A Case Study.
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AD-A148 886/3/GAR *514,667*

SHIPLEY, S. T.
Cumulus Cloud Venting of Mixed Layer Ozone,
PB85-144137/GAR *514,408*

SHIVELY, S. L.
Effects of Tempo and Intensity on Hyperactive Children.
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SHOEMAKER, D. H.
Improved Sensitivities in Laser Interferometers for the Detection of Gravitational Waves.
N85-13232/2/GAR *515,574*

SHOPE, G. L.
Evaluation of an Advanced Combat Vehicle Identification (CVI) Training Program (Masking): A New Approach to Target Acquisition Training.
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SHORE, R. A.
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SHORT, D.
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General Purpose Signal Conditioning.
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SIBBERS, C. W.
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SIEGEL, A. I.
Maintenance Personnel Performance Simulation (MAPPS) Model.
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SIEGEL, D. M.
Review and Evaluation of the Evidence for Cancer Associated with Air Pollution.
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SIENICKI, J. J.
Debris Dispersal in Reactor Material Experiments on Corium-Water Thermal Interactions in Ex-Vessel Geometry.
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SIERRA, M. J.
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SIGETY, P.
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PB85-141588/GAR *514,982*

SIGNER, H. R.
Effect of Two Inner-Ring Oil-Flow Distribution Schemes on the Operating Characteristics of a 35 Millimeter Bore Ball Bearing to 2.5 Million Dn.
N85-13233/0/GAR *515,165*

SILLWOOD, J. M.
Prediction of Long Term Strength of Glass Reinforced Plastics in Wet Environments,
PB85-138360/GAR *514,981*

SILVA, O. D.
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SIM, A. G.
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SINGER, C. E.
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SINGER, H. W.
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SINGH, M. S.
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SINGHAL, A. K.
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SIVAVEC, T. M.
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SJOEGREN, P.
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NUREG/CR-3752/GAR *515,418*

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SLEDGE, F. R.
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SLOMAN, M.
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SMITH, P. L.
Absolute Transition Probabilities of Lines in the Spectra of Astrophysical Atoms, Molecules, and Ions.
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SMITH, R.
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PB85-144046/GAR *515,239*

SMITH, R. D.
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DE85000827/GAR *515,623*

SMITH, R. E.
Pigeonpeas (Cajanus cajan Millsp.): A Valuable Crop of the Tropics.
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SMITH, R. M.
Follow-On 40-kW Field Test Support.
PB85-151322/GAR *514,926*

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SMITH, W.
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AD-A148 968/1 *514,737*

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Computer Center CDC Libraries.
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SOMORJAI, G. A.
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SONJU, O. K.
Experimental Study of Turbulent Jet Diffusion Flames (Revised Version).
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SONTAG, A.
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SOREL, M.
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SORIAGA, M. P.
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Combustion Waves in Dispersed-2-Phase Mixtures.
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SPAMPINATO, P. T.
Remote Handling Requirements and Considerations for D-T Fusion Reactors.
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SPANGGORD, R. J.
Environmental Fate Studies of HMX Screening Studies. Phase 1.
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SPARKS, C. J.
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SPEER, T. M.
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SPENCER, B. W.
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SPILLE, F.
Calculation through Fault Tree Analysis of the Probability of a Warhead Being Armed Prior to Launch.
AD-P004 339/8/GAR *515,274*

SPRAGUE, H. B.
Production, Storage and Feeding of Herbaceous Forages to Support Ruminant Livestock in Developing Countries of the Tropics and Subtropics.
PB85-143089/GAR *514,374*

Soil Improvement, Rainfall Conservation, and Erosion Control in Developing Countries.
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SPRANGLE, P.
Free Electron Laser with a Rotating Quadrupole Wiggler.
AD-A149 052/3/GAR *515,545*

SPREITER, J. R.
Magnetohydrodynamic and Gasdynamic Theories for Planetary Bow Waves.
N85-13760/2/GAR *514,399*

SPRINGFIELD, B. W.
Equipment Profiles for Major Items of Engineer Equipment.
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SQUARER, D.
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ST, J.
Study of the Cooperative Movement in Honduras,
PB85-133635/GAR *514,346*

STACEY, G. J.
Far-Infrared Line Emission from the Galaxy.
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STADLER, J. J.
Role of Mining in the South African Economy,
PB85-139228/GAR *514,467*

STAEHLE, R. L.
Technologies for Space Station Autonomy.
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STAHARA, S. S.
Magnetohydrodynamic and Gasdynamic Theories for Planetary Bow Waves.
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STALLMANN, F. W.
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STANGE, A.
Fluorescent Dyes for Luminescent Solar Concentrators.
N85-13061/5/GAR *514,919*

STANIUNAS, J. W.
Follow-On 40-kW Field Test Support.
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STANSBURY, J. W.
Biocompatible Cementitious Dental Compositions.
PATENT-4 486 179 *514,956*

STEBBINGS, R. F.
Laboratory Studies of Atomic Collision Processes of Importance in Planetary Atmospheres.
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STEEL, E. B.
Mineralogical Characteristics of Asbestos.
PB85-143675 *514,750*

STEFAN, G.
Calculation through Fault Tree Analysis of the Probability of a Warhead Being Armed Prior to Launch,
AD-P004 339/8/GAR *515,274*

STEIN, J. P.
Children and Women in Traditional and Cash Crop Agriculture: A Preliminary Cross-Section Study of Economic Development in Guatemala,
PB85-143709/GAR *514,355*

STEINBERG, D. I.
Economic Development of Korea: Sui Generis or Generic.
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Elimination of Sensor Artifacts from Infrared Data.
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STEINER, D.
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STENBAKKEN, G. N.
Wideband Sampling Wattmeter.
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STEPHENS, J. R.
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STERNE, M.
Azores Earthquake Reconstruction, January 1, 1980: A Report after Two and One Half Years,
PB85-144616/GAR *514,773*

STEWART, R. B.
Thermodynamic Properties of Ethylene at Saturation.
PB85-151777 *514,722*

STICKFORD, G. H.
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TAGGART, H. E.
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Instrumented Impact Testing Machine with Reduced Specimen Oscillation Effects.
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Boston Elbow.
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Sodium Chemistry in the MEL In-Sodium Creep Facilities,
PB85-143139/GAR *515,237*

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WANDLING, C. R.
Infrared-Thermal Wave Scanner for NDE of Naval Thermal Spray Coatings.
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WANG, A. S. D.
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WANG, C. L.
Approaches to Ultrafast Neutron Detectors.
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WANG, C. S.
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WARNER, K. R.
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WARNICK, W. L.
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WEBER, H. P.
Analysis of Single-Mode Evanescent-Field-Pumped Dye Amplifier,
PB85-143238/GAR *515,547*

WEBSTER, L.
Fiber Optic Data Bus Using Frequency Division Multiplexing (FDM) (Frequency Division Multiplexing) and an Asymmetric Coupler.
N85-13139/9/GAR *515,284*

WEGLEIN, R. D.
Nondestructive Method for Detecting Machine Damage in Beryllium.
DE85001074/GAR *515,203*

WEHUNT, E. J.
Soil Sampling Apparatus.
PAT-APPL-6-637 241/GAR *514,780*

WEINER, J. H.
Basic Research on Macromolecular Dynamics.
PB85-152833/GAR *515,015*

WEISCHEDEL, H. R.
Electromagnetic Inspection of Wire Ropes Using Sensor Arrays.
AD-A149 016/8/GAR *514,985*

WEISS, M.
Separating the Variances of Noise Components in the Global Positioning System.
PB85-151710 *515,306*

WEISS, W. C.
Adaptation of an Air-Dielectric RF Cable for Use as an Oil-Filled High Voltage Pulse Transmission Line.
DE84017414/GAR *514,785*

WELCH, A. J.
Measurement and Prediction of Thermal Injury in the Retina of the Rhesus Monkey.
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WENDT, J. O. L.
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WERNER, L. H.
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WERNERS, B.
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PB85-149706/GAR *514,730*

WESTERFIELD, E. E.
Transdigitizer for Relaying Signals from Global Positioning System (GPS) Satellites.
PAT-APPL-6-666 784/GAR *515,305*

WESTERINK, J. J.
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WHEATER, J. F.
Deconfining Transitions in 2+ 1 Dimensional SU(3) and SU(4) Gauge Theories,
PB85-139764/GAR *515,575*
Scales of Deconfinement,
PB85-139772/GAR *515,567*

WHEATON, T. R.
Yaughan and Curriboo Plantations: Studies in Afro-American Archaeology.
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WHEELER, W. A.
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WIBERLY, S. E.
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WICHITA, J.
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PB85-146702/GAR *514,539*

WICHNER, R. P.
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WIEDER, H. H.
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AD-A148 881/5/GAR *515,583*

WIEDWALD, J. D.
Approaches to Ultrafast Neutron Detectors.
DE85001206/GAR *515,347*

WIENCEK, T. C.
Differential Thermal Analysis Study of U sub 3 Si-Al and U sub 3 Si sub 2 -Al Reactions.
DE85002647/GAR *515,489*

WIKLANDER, D.
Stress Intensity Factors for Corner Cracks at Holes Located Near an Edge.
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WILEDEN, J. C.
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WILEMSKI, G.
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DE85000067/GAR *514,894*

WILLIAMS, J. D.
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WILLIAMSON, D. F.
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WILSON, W. S.
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WINBERRY, W. T.
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PB85-143261/GAR *514,713*

WINGFIELD, M. E.
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AD-A148 942/6/GAR *514,580*

WINJE, D. K.
Disparities in Nuclear Power Plant Performance in the United States and the Federal Republic of Germany,
PB85-142735/GAR *515,467*

WINKLER, W.
Improved Sensitivities in Laser Interferometers for the Detection of Gravitational Waves.
N85-13232/2/GAR *515,574*

WINN, C. B.
Research Priorities for Improving the Effectiveness of Active Solar Hot Water and Space Conditioning Systems.
PB85-153443/GAR *515,076*

WINSHIP, C. T.
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WISE, C.
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PB85-134716/GAR *514,535*

WITCZAK, M. W.
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AD-A148 967/3/GAR *514,345*

WOLF, D.
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WOLF, J. J.
Maintenance Personnel Performance Simulation (MAPPS) Model.
DE85002324/GAR *515,361*

WOLF, M. A.
Use of a Commercial Ranging System in Field Surveys of Radioactively Contaminated Sites.
DE85002384/GAR *515,354*

WOLF, R. E.
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WOLLER, D. M.
Public Groundwater Supplies in Will County,
PB85-138550/GAR *514,753*

WOLLNIK, H.
Time-of-Flight Isochronous (TOFI) Spectrometer for Direct Mass Measurements of Exotic Light Nuclei.
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WOOD, M. H.
PFR/TREAT Program: Objectives, Accomplishments, and Plans.
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WOOD, T. S.
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WOODRUFF, R. W.
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WOODS, W. J.
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PFR/TREAT Program: Objectives, Accomplishments, and Plans.
DE84014751/GAR *515,472*

WOODWARD, J.
Artificial Photosynthesis with Algal and Reconstituted Systems.
DE85002557/GAR *515,660*

WORLEY, B. A.
Flux Synthesis for the on-Line Surveillance of Nuclear Power Plants.
DE85000928/GAR *515,485*

WORTH, G. M.
Use of a Commercial Ranging System in Field Surveys of Radioactively Contaminated Sites.
DE85002384/GAR *515,354*

WOUTERS, J. M.
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DE85002050/GAR *515,352*

WRIGHT, A. E.
Comparison of L04, L05, and L07: Three Irradiated 7-Pin Bundle TUCOP Tests.
DE84014680/GAR *515,471*

WRIGHT, J. E.
Assessment of Muscle Strength and Prediction of Lifting Capacity in U.S. Army Personnel,
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WRIGHT, S. A.
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WRIGLEY, R. C.
Investigation of Several Aspects of LANDSAT 4/5 Data Quality.
N85-13357/7/GAR *514,823*

WU, J. M.
Aerodynamic Improvements by Discrete Wing Tip Jets.
AD-A148 981/4/GAR *514,314*

WU, W. T.
Interactions Between Corrosion and Creep of Uncoated and Coated Superalloys in Sulfate Melts.
N85-13038/3/GAR *514,995*

WYLIE, A. G.
Mineralogical Characteristics of Asbestos.
PB85-143675 *514,750*

XIE, Q.
Transfer of Particulate Organic Carbon and Nitrogen from the Yangtze River to the Ocean.
AD-A148 931/9/GAR *514,752*

XIE, Z. N.
Ovipositional Stimulant for Trichogramma Spp.
PATENT-4 484 539 *514,602*

XUELIANG, L.
Piezoelectric Stress Transducer Used for Measurements of Explosions in Hard Rock.
DE85000300/GAR *515,509*

YAMAMOTO, K.
Experimental Investigation of Shock-Cell Noise Reduction for Dual-Stream Nozzles in Simulated Flight.
N85-13549/9/GAR *515,687*

Experimental Investigation of Shock-Cell Noise Reduction for Single Stream Nozzles in Simulated Flight.
N85-13550/7/GAR 515,688

YAMANO, L. C.

Bistatic Coherent Radar Receiving System.
PAT-APPL-6-666 841/GAR 515,308

YANG, Z.

Transfer of Particulate Organic Carbon and Nitrogen from the Yangtze River to the Ocean.
AD-A148 931/9/GAR 514,752

YARN, J.

Maps Depicting Nonattainment Areas Pursuant to Section 107 of the Clean Air Act - 1984,
PB85-140630/GAR 515,097

YEE, A. F.

Toughening Mechanism in Elastomer-Modified Epoxy Resins, Part 2.
N85-13046/6/GAR 515,018

YEE, K. W.

Rotating Tool Wear Monitoring Apparatus.
PATENT-4 471 444 515,169

Use of Drill-Up for On-Line Determination of Drill Wear.
PB85-144988 515,245

YEH, C. L.

Noise Removal in Multichannel Images.
N85-13526/7/GAR 514,829

Restoration of Multichannel Microwave Radiometric Images.
N85-13527/5/GAR 514,830

YOSHINO, K.

Absolute Transition Probabilities of Lines in the Spectra of Astrophysical Atoms, Molecules, and Ions.
N85-13705/7/GAR 514,393

YOUNG, A. J.

Skeletal Muscle Metabolism during Exercise is Influenced by Heat Acclimation,
AD-A148 845/1/GAR 514,658

YOUNG, G. R.

Large Acceptance Spectrometers for pi exp 0 Mesons.
DE85002472/GAR 515,357

YOUNG, J. K.

Opportunities for Energy Conservation Through Biotechnology.
DE85002660/GAR 515,661

YOUNG, J. S.

Bivalve Fouling of Nuclear Power Plant Service-Water Systems. Volume 1. Correlation of Bivalve Biological Characteristics and Raw-Water System Design,
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YOUNT, J. A.

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DE85001194/GAR 515,380

YUNKER, G. W.

Statistical Analysis of Helicopter Pilot Performance during Instrument Flight Across Repeated Flights.
AD-A148 903/8/GAR 514,514

ZABELL, S. L.

W.E. Johnson's 'Sufficientness' Postulate.
AD-A149 014/3/GAR 515,022

ZAGORSKI, H. J.

Training Objectives for Tank Platoon Leaders: A Focus Group Evaluation.
AD-A148 910/3/GAR 514,543

ZAGORSKI, Z. P.

Thermal Effects in Radiation Processing.
DE85002638/GAR 514,729

ZAININGER, H. W.

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ZALUZEC, N. J.

Calculation of Si(Li) X-Ray Detector Efficiencies.
DE85002732/GAR 515,211

Comparison of XEDS and EELS Using Conventional Beryllium Window and Windowless Detectors.
DE85002734/GAR 515,212

ZANG, L.

Long-Range Predictive Control Using Weighting-Sequence Models.
N85-13521/8/GAR 515,039

ZANGER, M.

Fiber Optic Data Bus Using Frequency Division Multiplexing (FDM) (Frequency Division Multiplexing) and an Asymmetric Coupler.
N85-13139/9/GAR 515,284

ZANK, N. S.

Financial Leverage Potential of Local Currency Proceeds Generated from the Food for Peace Program to Stimulate Private Enterprise in Developing Countries,
PB85-143097/GAR 514,481

ZANNELLI, D.

Guidelines for the Use of Color in SUBACS (Submarine Advanced Combat System) A Displays.
AD-A148 924/4/GAR 514,504

ZHANG, N.

Local Slot Boundary Condition for Transonic Flow Calculations in Slotted-Wall Test Sections of Wind Tunnels.
N85-12879/1/GAR 515,219

ZHAO, G.

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AD-A149 059/8/GAR 515,199

ZHOU, M.

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AD-A149 060/6/GAR 515,570

ZIEGLER, N. F.

Status Report on the ORNL (Oak Ridge National Laboratory) 25 URC Accelerator.
DE85002498/GAR 515,554

ZIEPLER, G.

Structural Changes During Milling of Aluminum Oxide Powders.
N85-13008/6/GAR 514,959

ZILLESSEN, C.

Technical Equipment for Rescuing Injured Miners in Case of Roof Breaks in Coal Faces and Roadways.
DE84752107/GAR 514,757

ZIMMERLE, J.

Reliability, Availability, and Maintainability of the Heat Recovery Incinerator at Naval Air Station , Jacksonville.
AD-A148 884/0/GAR 515,057

ZIMMERMAN, D. C.

Data Base Development for Ship Readiness Analyses.
AD-A149 036/6/GAR 514,814

ZIMMERMANN, H. J.

Efficient Algorithm for Fuzzy Linear Programming with Multiple Objectives.
AD-A149 012/7/GAR 515,051

ZION, P. M.

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ZOLLINGER, W. D.

Monoclonal Antibodies to Serotype 2 and Serotype 15 Outer Membrane Proteins of Neisseria meningitidis and Their Use in Serotyping.
AD-A148 970/7/GAR 514,581

ZURFLUH, G.

Un Systeme de Documentation Electronique (An Electronic Documentation System).
N85-13883/6/GAR 514,449

ZWEIFEL, P. F.

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DE85000848/GAR 515,037

ZYSNO, P.

Efficient Algorithm for Fuzzy Linear Programming with Multiple Objectives.
AD-A149 012/7/GAR 515,051

CORPORATE AUTHOR INDEX

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In this index, the name of the company, university, or government agency that performed the research or prepared the report is listed. Entries are arranged first by the organization's name, then alphanumerically by the performing organization report or series number. If no report or series number is included, the subarrangement is by NTIS order number.

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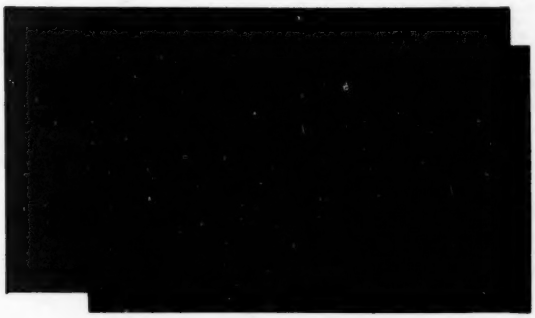

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AD-A149 026/3/GAR *515,680*

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AD-A149 025/9/GAR *514,329*

AGARD-LS-137
Process Modeling Applied to Metal Forming and Thermo-mechanical Processing,
AD-A149 027/5/GAR *515,146*

AERONAUTICAL RESEARCH INST. OF SWEDEN, STOCKHOLM.

FFA-TN-1984-20
Stress Intensity Factors for Corner Cracks at Holes Located Near an Edge.
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Local Slot Boundary Condition for Transonic Flow Calculations in Slotted-Wall Test Sections of Wind Tunnels.
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Conformal Mapping Suitable for Problems Involving Interaction Between Given Geometries and Known Far Fields.
AD-A149 050/7/GAR *515,030*

ARL-STRUC-R-398
Improving the Fatigue Life of the Mirage IIIO Wing Main Spar.
AD-A149 054/9/GAR *514,333*

ARL-STRUC-TM-381
Long Term Durability of Urea Formaldehyde Glued Joints Removed from Vampire Aircraft.
AD-A149 053/1/GAR *514,332*

ARL-SYS-TM-73
Array Processor Utilisation in the Computation of Real-Time Images.
AD-A149 051/5/GAR *515,302*

AERONAUTICAL SYSTEMS DIV., WRIGHT-PATTERSON AFB, OH.

ASD-TR-84-5026
Evaluation of the Birdstrike Threat to the F-15 Present Fleet, Rapid Deployment Force, and Dual Role Fighter Transparencies.
AD-A148 954/1/GAR *514,331*

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PAT-APPL-6-679 971/GAR *514,866*

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PAT-APPL-6-658 945/GAR *514,565*

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N85-12894/0/GAR *515,684*

NAS 1.26:174112
Technologies for Space Station Autonomy.
(NASA-CR-174112)
N85-12906/2/GAR *515,713*

NAS 1.26:174161
International Test and Demonstration of a 1-Mw Wellhead Generator: Helical Screw Expander Power Plant.
(NASA-CR-174161)
N85-13372/6/GAR *514,946*

NAS 1.26:174162
Multisensor Satellite Data Integration for Sea Surface Wind Speed and Direction Determination.
(NASA-CR-174162)
N85-13446/8/GAR *514,770*

NAS 1.26:174163
Evaluation of Heat Engine for Hybrid Vehicle Application.
(NASA-CR-174163)
N85-13245/4/GAR *515,604*

NAS 1.26:174169
Coastal Zone Color Scanner (CZCS): Imagery of Near-Surface Phytoplankton Pigment Concentrations from the First Coastal Ocean Dynamics Experiment (CODE-1), March - July 1981.
(NASA-CR-174169)
N85-13447/6/GAR *514,733*

NAS 1.26:174170
Mission Science Value-Cost Savings from the Advanced Imaging Communication System (AICS) (Advanced Imaging Communication System).
(NASA-CR-174170)
N85-12905/4/GAR *515,283*

JOHNS HOPKINS UNIV., BALTIMORE, MD. DEPT. OF EARTH AND PLANETARY SCIENCES.

NAS 1.26:174155
Lithospheric Structure in the Pacific Geoid.
(NASA-CR-174155)
N85-13365/0/GAR *514,739*

JOHNS HOPKINS UNIV., LAUREL, MD. CHEMICAL PROPULSION INFORMATION AGENCY.

CPIA-PUB-409-VOL-1
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AD-A148 865/9 *515,697*

JOINT INST. FOR LAB. ASTROPHYSICS, BOULDER, CO.

NAS 1.26:174164
RS CV sub n Binary Systems.
(NASA-CR-174164)
N85-13704/0/GAR *514,392*

NAS 1.26:174165
Outer Atmospheres of Giant and Supergiant Stars.
(NASA-CR-174165)
N85-13703/2/GAR *514,391*

KANSAS UNIV./CENTER FOR RESEARCH, INC., LAWRENCE.

KU-FRL-510-1
Preliminary Checkout, Evaluation and Calibration of a 3-Component Force Measurement System for Calibrating Propulsion Simulators for Wind Tunnel Models.
(NASA-CR-174113)
N85-12903/9/GAR *515,220*

NAS 1.26:174001
Scattering Models in the Microwave Regime.
(NASA-CR-174001)
N85-13361/9/GAR *515,591*

NAS 1.26:174113
Preliminary Checkout, Evaluation and Calibration of a 3-Component Force Measurement System for Calibrating Propulsion Simulators for Wind Tunnel Models.
(NASA-CR-174113)
N85-12903/9/GAR *515,220*

KANSAS UNIV. MEDICAL CENTER, KANSAS CITY. DEPT. OF MEDICINE.

Blood Substitutes: Effects on Drug Pharmacokinetics.
AD-A148 928/5/GAR *514,639*

KARLSRUHE UNIV. (GERMANY, F.R.). FAKULTAET FUER CHEMIEINGENIEURWESEN.

NP-4770495
Experimental Investigations on the Reaction Structure in Folded Pre-Mixed Flame Fronts.
DE84770495/GAR *515,594*

KARLSRUHE UNIV. (GERMANY, F.R.). INST. FUER WIRTSCHAFTSTHEORIE.

NP-4770505
Some Environmental Aspects of Optimal Economic Growth.
DE84770505/GAR *514,459*

NP-4770507
Optimal Growth Policies for Resource-Dependent Open Economies.
DE84770507/GAR *514,460*

KENT UNIV., CANTERBURY (ENGLAND). COMPUTING LAB.

UKC COMPUTING LAB-26
I-PIGS: A Concurrent Programming Environment with Interactive Graphical Support,
PB85-140846/GAR *514,836*

KENTUCKY UNIV., LEXINGTON. DEPT. OF CHEMISTRY.

UK/DC/TR-4
Structures of Three Pyrazaboles: 1,3,5,7-Tetramethylpyrazabole; 4,4-Bis(pyrazol-1'-yl)pyrazabole; 4,4,8,8-Tetrakis(pyrazol-1'yl)pyrazabole.
AD-A148 995/4/GAR *514,687*

UK/DC/TR-5
Boron Derivatives of 3-Methylpyrazole.
AD-A148 980/6/GAR *514,682*

KENTUCKY UNIV., LEXINGTON. INST. FOR MINING AND MINERALS RESEARCH.

IMMR83-079
Design Report on the Atmospheric Fluidized Bed Combustor at the Kentucky Center for Energy Research Laboratory,
PB85-138915/GAR *515,092*

KERNFORSCHUNGSANLAGE JUELICH G.M.B.H. (GERMANY, F.R.). INST. FUER NUKLEARE SICHERHEITSFORSCHUNG.

JUEL-1916
PRIAMUS: Ein Rechenprogramm zur Bestimmung Thermophysikalischer Stoffwerte von Gasmischungen Aus O2, N2, CO, CO7, He, H2O, H2 und CH4 (PRIAMUS, a Computer Program for the Calculation of Thermophysical Properties of Gas Mixtures Containing O2, N2, CO, CO2, He, H2O, H2, CH4).
N85-13002/9/GAR *514,703*

KMS FUSION, INC., ANN ARBOR, MI.

KMSF-U1526
Two-Stage Free Electron Laser Research.
AD-A148 951/7/GAR *515,543*

KROHNE MESSTECHNIK G.M.B.H. UND CO. K.G., DUISBURG (GERMANY, F.R.).

BMFT-FB-T-84-136
Magnetic Inductive Flowmeter for Low Conducting Liquids.
N85-13216/5/GAR *515,225*

LABORATOIRES DE MARCOUSSIS - CENTRE DE RECHERCHES (FRANCE).

Coupleur Semi Passif Integre pour Reseau a Fibres Optiques (Integrated Semi-Passive Coupler for Optical Fiber System),
PB85-144699/GAR *515,552*

LAMONT-DOHERTY GEOLOGICAL OBSERVATORY, PALISADES, NY.

Field Experiment Determinations of Distribution Coefficients of Actinide Elements in Sulfate Lake Environments.
NUREG/CR-4094/GAR *515,341*

LAWRENCE LIVERMORE NATIONAL LAB., CA.

CONF-830763-17
Detonation E.O.S. Patterns for Several Explosives.
DE85001039/GAR *515,499*

CONF-831265-7
Review of AVLIS Technology for Production-Scale LIS Systems and Construction.
DE85002002/GAR *515,338*

CONF-840627-12
Neutron and gamma-Ray Dose Measurements at Various Distances from the Little Boy Replica.
DE85002172/GAR *515,267*

CONF-840721-3
Subsidence in the Craters of Nuclear Tests at the Pacific Proving Grounds.
DE85000747/GAR *515,344*

CONF-840738-8
Nondestructive Method for Detecting Machine Damage in Beryllium.
DE85001074/GAR *515,203*

CONF-840896-1
DOE Hazard Classification for Insensitive High Explosives (IHE).
DE84017002/GAR *515,496*

CONF-840901-19
Finite Element Method for Solving Neutron Transport Problems.
DE85001075/GAR *515,379*

CONF-840915-7
Comparison of Three ICF Reactor Designs.
DE85001211/GAR *515,320*

CONF-840922-16
Approaches to Ultrafast Neutron Detectors.
DE85001206/GAR *515,347*

CONF-841007-7
Impact of Instrument Response Variations on Health Physics Measurements.
DE85000860/GAR *514,583*

CONF-841243-1-Rev.1
Post-Processing of Bibliographic Citations from DOE/RECON, NASA/RECON, and DOD/DROLS. Revision 1.
DE85000617/GAR *514,443*

CONF-8408113-1
Use of the ORACLE DBMS in Determining the Response of Complex Scientific Instrumentation.
DE85001742/GAR *515,328*

CONF-8411103-1
Adaptation of an Air-Dielectric RF Cable for Use as an Oil-Filled High Voltage Pulse Transmission Line.
DE84017414/GAR *514,785*

UCID-19323-84-2
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UCRL-Trans-12018
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DE85001728/GAR *515,326*

UCRL-53500-VOL-3
Probability of Pipe Failure in the Reactor Coolant Loops of Combustion Engineering PWR Plants. Vol. 3. Double-Ended Guillotine Break Indirectly Induced by Earthquakes.
NUREG/CR-3663-V3/GAR *515,452*

UCRL-89006
Detonation E.O.S. Patterns for Several Explosives.
DE85001039/GAR *515,499*

UCRL-89722
Review of AVLIS Technology for Production-Scale LIS Systems and Construction.
DE85002002/GAR *515,338*

UCRL-89995-Rev.1
Post-Processing of Bibliographic Citations from DOE/RECON, NASA/RECON, and DOD/DROLS. Revision 1.
DE85000617/GAR *514,443*

UCRL-90177
Neutron and gamma-Ray Dose Measurements at Various Distances from the Little Boy Replica.
DE85002172/GAR *515,267*

UCRL-90579
Finite Element Method for Solving Neutron Transport Problems.
DE85001075/GAR *515,379*

UCRL-90636
Use of the ORACLE DBMS in Determining the Response of Complex Scientific Instrumentation.
DE85001742/GAR *515,328*

UCRL-90665
Comparison of Three ICF Reactor Designs.
DE85001211/GAR *515,320*

UCRL-90670
Adaptation of an Air-Dielectric RF Cable for Use as an Oil-Filled High Voltage Pulse Transmission Line.
DE84017414/GAR *514,785*

UCRL-90743
Nondestructive Method for Detecting Machine Damage in Beryllium.
DE85001074/GAR *515,203*

UCRL-91317
Approaches to Ultrafast Neutron Detectors.
DE85001206/GAR *515,347*

UCRL-91420
DOE Hazard Classification for Insensitive High Explosives (IHE).
DE84017002/GAR *515,496*

UCRL-91583
Subsidence in the Craters of Nuclear Tests at the Pacific Proving Grounds.
DE85000747/GAR *515,344*

UCRL-91682
Impact of Instrument Response Variations on Health Physics Measurements.
DE85000860/GAR *514,583*

Measurement of Shock Induced Reaction in Rocket Propellants by Nanosecond Infrared Radiometry and Photography.
AD-P004 349/7/GAR *515,701*

LEHIGH UNIV., BETHLEHEM, PA. COXE LAB.

Characterization of Novel Binders Based on Energetic Thermoplastic Elastomers.
AD-A148 993/9/GAR *515,017*

LEITZ (ERNST) G.M.B.H., WETZLAR (GERMANY, F.R.)

BMFT-FB-T-84-151
Ion Contrasting Chamber for Discrimination of Grains and Textures.
N85-13036/7/GAR *514,993*

LIFE SYSTEMS, INC., CLEVELAND, OH.

Standard Operating Procedures for Conducting Sampling and Sample Bank Audits,
(EPA/600/4-85/003)
PB85-143279/GAR *515,238*

Analytical Reference Standards and Supplemental Data: The Pesticides and Industrial Chemicals Repository.
(EPA/600/4-84/062)
PB85-143766/GAR *514,714*

LIN (PING-WHA), ANGOLA, IN.

DOE/CE/15143-T1
Project on Sulfur Dioxide Removal and Waste Products Utilization Process. Final Report.
DE84017333/GAR *515,084*

CORPORATE AUTHOR INDEX

LONDON BUSINESS SCHOOL (ENGLAND). CENTRE FOR ECONOMIC FORECASTING.

DP-116
Some Issues in Dynamic Modelling and Forecasting.
PB85-139350/GAR *514,468*

LOS ALAMOS NATIONAL LAB., NM.

CONF-840783-3
X-Ray Holography of Biological Specimens.
DE85002437/GAR *514,656*

CONF-840910-12
Toroidal Fusion Core Experiment (TFCX) Studies.
DE84016813/GAR *515,309*

CONF-841007-8
Use of a Commercial Ranging System in Field Surveys of Radioactively Contaminated Sites.
DE85002384/GAR *515,354*

CONF-841007-13
Monte Carlo Simulation of the Sequential Probability Ratio Test for Radiation Monitoring.
DE85002409/GAR *515,355*

CONF-841007-14
Nondestructive Assay System Development for a Plutonium Scrap Recovery Facility.
DE85002421/GAR *515,412*

CONF-841007-16
Integration of NDA Instruments into the Savannah River Plant Computer Network.
DE85002416/GAR *515,356*

CONF-841105-1
Market Study of International Needs for New Electric Generating Capacity.
DE84014042/GAR *514,878*

CONF-841117-15
Low-Energy Nuclear Reactions with Hydrogen Isotopes.
DE85002388/GAR *515,564*

CONF-841187-1
Guide to Radiological Accident Considerations for Siting and Design of DOE Nonreactor Nuclear Facilities.
DE85002435/GAR *515,446*

CONF-8409143-8
Time-of-Flight Isochronous (TOFI) Spectrometer for Direct Mass Measurements of Exotic Light Nuclei.
DE85002050/GAR *515,352*

CONF-8409170-1
Application of Wald's Sequential Probability Ratio Test to Nuclear Materials Control.
DE85002017/GAR *515,479*

CONF-8410142-18
Los Alamos Nuclear Plant Analyzer: An Interactive Power-Plant Simulation Program.
DE85002412/GAR *515,445*

CONF-8410142-21
Interfacing Systems Loss-of-Coolant Accident in Oconee-1 Pressurized Water Reactor.
DE85000175/GAR *515,436*

CONF-8410166-2
Recent Development in Pyrochemistry at Los Alamos.
DE85000174/GAR *515,388*

CONF-8410173-1
Geothermal Pumping Systems.
DE85002246/GAR *514,907*

LA-ir-84-33
Present Status of Uranium-Plutonium Mixed Carbide Fuel Development for LMFBR.
DE84017212/GAR *515,474*

LA-ir-84-50
Piezoelectric Stress Transducer Used for Measurements of Explosions in Hard Rock.
DE85000300/GAR *515,509*

LA-UR-84-1948
Market Study of International Needs for New Electric Generating Capacity.
DE84014042/GAR *514,878*

LA-UR-84-2585
Toroidal Fusion Core Experiment (TFCX) Studies.
DE84016813/GAR *515,309*

LA-UR-84-2782
Application of Wald's Sequential Probability Ratio Test to Nuclear Materials Control.
DE85002017/GAR *515,479*

LA-UR-84-3055
Time-of-Flight Isochronous (TOFI) Spectrometer for Direct Mass Measurements of Exotic Light Nuclei.
DE85002050/GAR *515,352*

LA-UR-84-3233
Recent Development in Pyrochemistry at Los Alamos.
DE85000174/GAR *515,388*

LA-UR-84-3252
Geothermal Pumping Systems.
DE85002246/GAR *514,907*

LA-UR-84-3284
Interfacing Systems Loss-of-Coolant Accident in Oconee-1 Pressurized Water Reactor.
DE85000175/GAR *515,436*

LA-UR-84-3292
Laser-Based Diagnostics for Coal Gasification Instrumentation.
DE85002365/GAR *515,652*

LA-UR-84-3296
Use of a Commercial Ranging System in Field Surveys of Radioactively Contaminated Sites.
DE85002384/GAR *515,354*

LA-UR-84-3318
Los Alamos Nuclear Plant Analyzer: An Interactive Power-Plant Simulation Program.
DE85002412/GAR *515,445*

LA-UR-84-3340
X-Ray Holography of Biological Specimens.
DE85002437/GAR *514,656*

LA-UR-84-3349
Low-Energy Nuclear Reactions with Hydrogen Isotopes.
DE85002388/GAR *515,564*

LA-UR-84-3379
Nondestructive Assay System Development for a Plutonium Scrap Recovery Facility.
DE85002421/GAR *515,412*

LA-UR-84-3380
Monte Carlo Simulation of the Sequential Probability Ratio Test for Radiation Monitoring.
DE85002409/GAR *515,355*

LA-UR-84-3394
Integration of NDA Instruments into the Savannah River Plant Computer Network.
DE85002416/GAR *515,356*

LA-UR-84-3448
Guide to Radiological Accident Considerations for Siting and Design of DOE Nonreactor Nuclear Facilities.
DE85002435/GAR *515,446*

LA-10022-MS
Compact Approach to Monitored Retrievable Storage of Spent Fuel.
DE85002345/GAR *515,409*

LA-10045
Use of Calibration Standards and the Correction for Sample Self-Attenuation in gamma-Ray Nondestructive Assay.
DE85002347/GAR *515,339*

LA-10074-MS
Evaluation of the sup 63 Cu Activation Foil for Determining the Neutron Dose in the Energy Range of 1 EV to 1 MeV.
DE85001538/GAR *515,350*

LA-10159-LLWM
Distribution of Radionuclides and Water in Bandelier Tuff Beneath a Former Los Alamos Liquid Waste Disposal Site after 33 Years.
DE85001406/GAR *515,402*

LA-10200-MS
Compact Reversed-Field Pinch Reactors (CRFPR): Preliminary Engineering Considerations.
DE85002351/GAR *515,329*

LA-10226-M
Universal Fast Breeder Reactor Subassembly Counter Manual.
DE85001523/GAR *515,349*

LOUISIANA STATE UNIV., BATON ROUGE.

NAS 1.26:174153
Oscillator Strengths for OII Ions.
(NASA-CR-174153)
N85-13558/0/GAR *514,706*

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LMF-111
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NUREG/CR-3984/GAR *514,657*

LUNAR AND PLANETARY INST., HOUSTON, TX.

LPI-CONTRIB-540
Conference on the Origin of the Moon.
(NASA-CR-174068)
N85-13709/9/GAR *514,396*

NAS 1.26:174068
Conference on the Origin of the Moon.
(NASA-CR-174068)
N85-13709/9/GAR *514,396*

NAS 1.26:174069
Activities at the Lunar and Planetary Institute.
(NASA-CR-174069)
N85-13694/3/GAR *514,386*

MACHINE DESIGN ENGINEERS, INC., KENT, WA.

Development of a Prototype Flat Winding Machine for Winding Air Deployed Fiberoptic Cable.
AD-A149 036/2/GAR *515,164*

MACNEILL (JOHN S.), JR., HOMER, NY.

Feasibility Study of Alternative Technology for Small Community Water Supply.
(EPA/600/2-84/191)
PB85-143287/GAR *515,102*

MAGMA GULF/TECHNADRIL, HOUSTON, TX.

DOE/NV/10081-2
Sweet Lake Geopressured-Geothermal Project, Magma Gulf-Technadril/DOE Amoco Fee. Volume II. Surface Installations Reservoir Testing. Annual Report, February 29, 1981-February 10, 1982.
DE84016037/GAR *514,880*

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U.S.-Flag Crosstrading. Volume 1. Executive Summary.
(MA-MD-820-85010)
PB85-146553/GAR *514,488*

U.S.-Flag Crosstrading. Volume 2. U.S.-Flag Crosstrading Operations and U.S. Policy Options.
(MA-MD-820-85011)
PB85-146561/GAR *514,489*

U.S.-Flag Crosstrading. Volume 3. Impediments to U.S.-Flag Crosstrading Operations.
(MA-MD-820-85012)
PB85-146579/GAR *514,490*

MARTIN MARIETTA AEROSPACE, DENVER, CO. DENVER DIV.

MCR-84-549
Evaluation of Automated Decisionmaking Methodologies and Development of an Integrated Robotic System Simulation.
(NASA-CR-172401)
N85-13516/8/GAR *514,828*

NAS 1.26:171228
Definition of Technology Development Missions for Early Space Station Satellite Servicing. Volume 1. Executive Summary.
(NASA-CR-171228)
N85-12922/9/GAR *515,707*

NAS 1.26:171229
Definition of Technology Development Missions for Early Space Station Satellite Servicing. Volume 2. Technical.
(NASA-CR-171229)
N85-12923/7/GAR *515,708*

NAS 1.26:172401
Evaluation of Automated Decisionmaking Methodologies and Development of an Integrated Robotic System Simulation.
(NASA-CR-172401)
N85-13516/8/GAR *514,828*

SSS-FR-04-01-V-1
Definition of Technology Development Missions for Early Space Station Satellite Servicing. Volume 1. Executive Summary.
(NASA-CR-171228)
N85-12922/9/GAR *515,707*

SSS-FR-04-01-V-2
Definition of Technology Development Missions for Early Space Station Satellite Servicing. Volume 2. Technical.
(NASA-CR-171229)
N85-12923/7/GAR *515,708*

MARTIN MARIETTA CORP., BETHESDA, MD.

NAS 1.26:171222
Selected Tether Applications in Space: An Analysis of Five Selected Concepts.
(NASA-CR-171222)
N85-12921/1/GAR *515,706*

MARYLAND UNIV., COLLEGE PARK.

NAS 1.26:174106
Investigation of RF Excited CW CO2 Waveguide Lasers.
(NASA-CR-174106)
N85-13221/5/GAR *515,548*

NAS 1.26:174173
Modulation of the Cytosolic Androgen Receptor in Striated Muscle by Sex Steroids.
(NASA-CR-174173)
N85-13468/2/GAR *514,642*

MARYLAND UNIV., COLLEGE PARK. DEPT. OF PHYSICS AND ASTRONOMY.

AP-84-056
Solar Radio Bursts, Proton Events and Geomagnetic Activity.
(AFGL-TR-84-0259)
AD-A149 018/4/GAR *514,385*

SCIENTIFIC-1
Solar Radio Bursts, Proton Events and Geomagnetic Activity.
(AFGL-TR-84-0259)
AD-A149 018/4/GAR *514,385*

MARYLAND UNIV., COLLEGE PARK. DEPT. OF PSYCHOLOGY.

RR-84-1
Employee and Customer Perceptions of Service in Banks: Replication and Extension.
AD-A148 907/9/GAR *514,542*

MASSACHUSETTS DEPT. OF PUBLIC WELFARE, BOSTON.

Case Management and Prepaid Capitation as a Cost-Effective and Improved Method of Delivery of Dental Services: Massachusetts Dental Project.
PB85-146116/GAR *514,595*

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DOE/MC/20334-T11
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DE85000215/GAR *515,682*

FE-MIT-19207-4
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DE85002492/GAR *515,655*

MASSACHUSETTS INST. OF TECH., CAMBRIDGE. ARTIFICIAL INTELLIGENCE LAB.

AI-M-770
Selecting One Among the Many: A Simple Network Implementing Shifts in Selective Visual Attention.

AD-A148 989/7/GAR 514,545

AI-M-806
Collision Detection for Moving Polyhedra.
AD-A148 961/6/GAR 515,049

AI-M-809
Simplified Grasping and Manipulation with Dextrous Robot Hands.
AD-A148 962/4/GAR 515,169

AI-TR-789
Qualitative Process Theory.
AD-A148 987/1/GAR 514,810

AIM-804
Planning of Minimum-Time Trajectories for Robot Arms.
AD-A148 956/6/GAR 515,162

MASSACHUSETTS INST. OF TECH., CAMBRIDGE. ENERGY LAB.

MIT/EL-84/007
Ponding of Effluents from Fossil Fuel Steam Electric Power Plants.
PB85-144244/GAR 515,106

MIT/EL-84/008
Eulerian-Lagrangian Analysis of Pollutant Transport in Shallow Water.
PB85-144269/GAR 515,107

MIT/EL-84/011
Titan: An Advanced Three Dimensional Coupled Neutronic/Thermal-Hydraulics Code for Light Water Nuclear Reactor Core Analysis.
PB85-144251/GAR 515,470

MIT/EL-84/012
TEA: A Linear Frequency Domain Finite Element Model for Tidal Embayment Analysis.
PB85-142719/GAR 514,738

MIT/EL-84/013
Loop Simulation Capability for Sodium-Cooled Systems.
PB85-144236/GAR 515,459

MIT/EL-84/014
Titan Code Development for Application to a PWR Steam Line Break Accident, 1983-84.
PB85-142693/GAR 515,466

MIT/EL-84/015
Ambient Monitoring of Pollutants Around Synfuel Plants.
PB85-142701/GAR 515,100

MIT/EL-84/017
Internal Seal for Repairing Natural Gas Mains.
PB85-142685/GAR 514,957

MIT/EL-84/018
Disparities in Nuclear Power Plant Performance in the United States and the Federal Republic of Germany,
PB85-142735/GAR 515,467

MASSACHUSETTS INST. OF TECH., CAMBRIDGE. LAB. FOR COMPUTER SCIENCE.

MIT/LCS/TR-310
Cohesion in Computer Text Generation: Lexical Substitution.
AD-A148 990/5/GAR 514,811

MASSACHUSETTS INST. OF TECH., CAMBRIDGE. LAB. FOR INFORMATION AND DECISION SYSTEMS.

LIDS-P-1397
Multi Target Tracking by Dynamic Scene Analysis,
AD-A148 922/8/GAR 515,307

MASSACHUSETTS INST. OF TECH., CAMBRIDGE. RESEARCH LAB. OF ELECTRONICS.

TR-502
Object-Oriented Signal Processing Environment: The Knowledge-Based Signal Processing Package.
AD-A148 963/2/GAR 514,809

MASSACHUSETTS INST. OF TECH., LEXINGTON. LINCOLN LAB.

JA-5656
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L-15750
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DE85002440/GAR *515,413*

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DE85000611/GAR *515,378*

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DE85000192/GAR *514,896*

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SAND-84-2078C
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N85-13154/8/GAR *515,345*

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Hollow Ceramic Block: Containment of Water for Thermal Storage in Passive Solar Design. Final Technical Report.
DE85000217/GAR 514,952

WISCONSIN UNIV.-MADISON.

NAS 1.26:174115
Restoration of Multichannel Microwave Radiometric Images.
(NASA-CR-174115)
N85-13527/5/GAR 514,830

NAS 1.26:174116
Noise Removal in Multichannel Images.
(NASA-CR-174116)
N85-13526/7/GAR 514,829

WISCONSIN UNIV.-MADISON. MATHEMATICS RESEARCH CENTER.

MRC-TSR-2759
Symmetry Breaking for a Class of Semi-Linear Elliptic Problems.
AD-A149 093/7/GAR 515,034

MRC-TSR-2760
Remark on Regularization in Hilbert Spaces.
AD-A149 046/5/GAR 515,027

MRC-TSR-2761
Neumann Type Boundary Conditions for Hamilton-Jacobi Equations.
AD-A149 069/7/GAR 515,031

MRC-TSR-2762
Note on the Disturbance Decoupling Problem for Retarded Systems.
AD-A149 045/7/GAR 515,026

MRC-TSR-2763
Controlled Approximation and a Characterization of the Local Approximation Order.
AD-A149 095/2/GAR 515,036

MRC-TSR-2765
Regenerative Structure of Markov Chains Simulated via Common Random Numbers.
AD-A149 092/9/GAR 515,033

MRC-TSR-2766
Robust Kalman Filtering and Its Applications.
AD-A149 044/0/GAR 515,025

MRC-TSR-2769
Hamilton-Jacobi Equations in Infinite Dimensions. Part 1. Uniqueness of Viscosity Solutions,
AD-A149 094/5/GAR 515,035

MRC-TSR-2770
Recent Developments and Open Problems in the Mathematical Theory of Viscoelasticity.
AD-A149 043/2/GAR 515,576

MRC-TSR-2772
Asymptotic Representation of Solutions of the Basic Semiconductor Device Equations.
AD-A149 040/8/GAR 514,783

MRC-TSR-2775
Perturbation of a Multiple Eigenvalue in the Benard Problem for Two Fluid Layers.
AD-A149 068/9/GAR 515,529

WISCONSIN UNIV.-MILWAUKEE. SCHOOL OF SOCIAL WELFARE.

Adolescent Pregnancy and Childbearing: Findings from Research,
(NIH-PUB-81-2077)
SHR-0011823/GAR 514,563

WISCONSIN UNIV.-SUPERIOR. CENTER FOR LAKE SUPERIOR ENVIRONMENTAL STUDIES.

DOE/ER/10278-T1
Energy Awareness: A Comprehensive Approach. Final Report.
DE85000602/GAR 514,527

WOODS HOLE OCEANOGRAPHIC INSTITUTION, MA.

WHOI-CONTRIB-5357
Tidal Phase Control of Sediment Discharge from the Yangtze River.
AD-A148 876/6/GAR 514,735

WHOI-CONTRIB-5433
Transfer of Particulate Organic Carbon and Nitrogen from the Yangtze River to the Ocean.
AD-A148 931/9/GAR 514,752

WHOI-CONTRIB-5462
Finescale Velocity-Density Characteristics and Richardson Number Statistics of the Eastern Equatorial Pacific.
AD-A148 927/7/GAR 514,736

WHOI-CONTRIB-5550
Structure and Variability of Oceanic Crust on the Flanks of the East Pacific Rise between 11 and 13 N.
AD-A148 930/1/GAR 514,740

On the Dynamics of the Coupled Mixed Layer-Thermocline System and the Determination of the Oceanic Surface Density.
AD-A148 968/1 514,737

WORLD FERTILITY SURVEY, LONDON (ENGLAND).

Sudan Fertility Survey, 1979: A Summary of Findings.
(AID-PN-AAL-750)
PB85-138030/GAR 514,550

Evaluation of Birth Histories: A Case Study of Kenya.
(AID-PN-AAL-976)
PB85-141844/GAR 514,555

WYOMING UNIV., LARAMIE.

DOE/ER/10585-T2
Modelling for Ultrasonic Nondestructive Evaluation of Columnar Structures in Anisotropic Materials. Final Report.
DE85001085/GAR 515,522

YALE UNIV., NEW HAVEN, CT. DEPT. OF COMPUTER SCIENCE.

YALEU/DCS/RR-338
Managing Permanent Objects.
AD-A149 007/7/GAR 514,813

YALE UNIV., NEW HAVEN, CT. DEPT. OF MECHANICAL ENGINEERING.

Finite Element Analysis of Nonlinear Oscillations and Flutter of Shells of Revolution.
(AFOSR-TR-84-1126)
AD-A149 071/3/GAR 515,577

YALE UNIV., NEW HAVEN, CT. SCHOOL OF MEDICINE.

Use of ATP-MgCl2 in the Treatment of Injury and Shock.
AD-A149 031/7/GAR 514,641

ZAININGER ENGINEERING CO., SAN JOSE, CA.

ORNL/Sub-82-47905/1
Electromagnetic Pulse (EMP) Interaction with Electric Power Systems. Power Systems Technology Program. Final Report.
DE85000166/GAR 515,343

CONTRACT/GRANT NUMBER INDEX

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DE85000770/GAR *515,337*

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DE85002078/GAR *515,069*

AC01-79PE70078
RAND Corp., Santa Monica, CA.
DE85002686/GAR *515,662*

AC01-79PE70097
Centaur Associates, Inc., Washington, DC.
DE85002169/GAR *514,461*

AC02-76CH00016
Brookhaven National Lab., Upton, NY.
DE85001530/GAR *515,442*
DE85002610/GAR *515,557*
DE85002785/GAR *514,699*
DE85002788/GAR *514,913*
DE85003168/GAR *514,918*
DE85003169/GAR *514,530*

AC02-76CH03073
Princeton Univ., NJ. Plasma Physics Lab.
DE84017063/GAR *515,310*
DE85002702/GAR *515,572*
DE85002703/GAR *515,334*
DE85002706/GAR *515,526*
DE85002711/GAR *515,335*
DE85002714/GAR *515,336*

AC02-76ER00038
Notre Dame Univ., IN. Radiation Lab.
DE85002635/GAR *514,728*
DE85002638/GAR *514,729*

AC02-78ER04650
Northwestern Univ., Evanston, IL. Dept. of Engineering Science and Applied Mathematics.
DE85001529/GAR *515,596*

AC02-78ER05016
Brigham Young Univ., Provo, UT.
DE85000807/GAR *514,695*

AC02-79EV10244
Utah Univ., Salt Lake City. Dept. of Chemistry.
DE85000869/GAR *514,676*

AC02-79EV10305
Colorado State Univ., Fort Collins. Dept. of Radiology and Radiation Biology.
DE85000005/GAR *515,422*

AC02-80ET17019
General Electric Co., Schenectady, NY. Advanced Energy Programs Dept.
DE84014425/GAR *514,928*
DE84014426/GAR *514,929*

AC02-80ET17089
Westinghouse Research and Development Center, Pittsburgh, PA.
DE84015597/GAR *514,930*

AC02-83CH10093
Solar Energy Research Inst., Golden, CO.
DE84013012/GAR *514,876*
DE84013029/GAR *514,877*
DE84013035/GAR *514,568*
DE84013039/GAR *515,011*
DE84013046/GAR *515,062*
DE85000505/GAR *515,620*
DE85000508/GAR *515,065*
DE85000509/GAR *515,066*
DE85001914/GAR *515,633*

AC02-83CH10140
Battelle Project Management Div., Columbus, OH. Office of Nuclear Waste Isolation.
DE85001539/GAR *515,403*
Earth Technology Corp., Houston, TX.
DE85000787/GAR *515,394*
DE85002302/GAR *515,404*

AC02-83ER53163
Rensselaer Polytechnic Inst., Troy, NY. Dept. of Nuclear Engineering.
DE85000437/GAR *515,312*

AC02-83ER60121
Cooperative Inst. for Research in Environmental Science, Boulder, CO.
DE85001408/GAR *515,628*

AC02-84ER13154
Physical Sciences, Inc., Andover, MA.
DE85000857/GAR *514,696*

AC03-76SF00098
California Univ., Berkeley. Lawrence Berkeley Lab.
DE85000624/GAR *514,694*
DE85000670/GAR *515,519*
DE85000685/GAR *515,520*
DE85000711/GAR *515,120*
DE85001197/GAR *515,399*
DE85001402/GAR *515,348*
DE85001650/GAR *514,697*
DE85001651/GAR *515,351*
DE85003056/GAR *515,666*
DE85003058/GAR *515,089*
Pennsylvania Univ., Philadelphia.
DE85001032/GAR *514,955*
Sandia National Labs., Livermore, CA.
DE85002551/GAR *515,555*

AC03-76SF00515
Stanford Linear Accelerator Center, CA.
DE85002587/GAR *515,556*
DE85002605/GAR *515,359*
DE85002628/GAR *515,558*
DE85002686/GAR *515,210*
DE85002721/GAR *515,559*

AC03-78SF01424
Conoco, Inc., Casper, WY.
DE85002157/GAR *514,761*

CONTRACT/GRANT NUMBER INDEX

AC03-79SF10540
Texas Univ. at Austin. Center for Energy Studies.
DE85002757/GAR 515,072

AC03-81SF11515
Aerospace Corp., El Segundo, CA. Energy and Resources Div.
DE85002153/GAR 514,760
DE85002164/GAR 514,762
DE85002165/GAR 514,763

AC03-83SF11939
Southwest Research Inst., San Antonio, TX.
DE85001482/GAR 514,677

AC04-76DP00053
Monsanto Research Corp., Miamisburg, OH. Mound.
DE85000420/GAR 514,675
DE85001535/GAR 515,381
DE85002527/GAR 515,206
DE85002552/GAR 515,340

AC04-76DP00613
Bendix Corp., Kansas City, MO.
DE84016252/GAR 515,195

AC04-76DP00789
Battelle Pacific Northwest Labs., Richland, WA.
DE85002444/GAR 515,385
BDM Corp., Albuquerque, NM.
DE85002650/GAR 514,910
Foster Wheeler Solar Development Corp., Livington, NJ.
DE85000874/GAR 514,903
Risk Management Associates, Albuquerque, NM.
DE85002442/GAR 515,384
Sandia National Labs., Albuquerque, NM.
DE84017005/GAR 515,373
DE84017007/GAR 515,374
DE84017251/GAR 515,497
DE84017361/GAR 515,434
DE85000192/GAR 514,896
DE85000197/GAR 515,498
DE85000413/GAR 515,390
DE85000457/GAR 515,265
DE85000611/GAR 515,378
DE85000666/GAR 514,902
DE85000676/GAR 515,562
DE85001710/GAR 515,553
DE85002430/GAR 515,383
DE85002440/GAR 515,413
DE85002634/GAR 514,941
DE85002683/GAR 514,911

AC04-76DR00789
Foster Wheeler Solar Development Corp., Livington, NJ.
DE85000874/GAR 514,903
Sandia National Labs., Livermore, CA.
DE85000257/GAR 515,201
DE85002551/GAR 515,555

AC05-79OR03054
International Coal Refining Co., Allentown, PA.
DE85000031/GAR 515,609
DE85000032/GAR 515,610
DE85000033/GAR 515,611
DE85000794/GAR 515,621
DE85001240/GAR 515,626
Parsons (Ralph M.) Co., Pasadena, CA.
DE85001217/GAR 515,625
DE85001662/GAR 515,629

AC05-84OR21400
Applied Psychological Services, Inc., Wayne, PA.
DE85002324/GAR 515,361
Babcock and Wilcox Co., Lynchburg, VA. Utility Power Generation Div.
DE85001510/GAR 515,441
Battelle Columbus Labs., OH.
DE85002567/GAR 515,071
Oak Ridge National Lab., TN.
DE84017213/GAR 514,881
DE85000160/GAR 514,601
DE85000161/GAR 514,692
DE85000163/GAR 515,612
DE85000167/GAR 514,526
DE85000448/GAR 515,313
DE85000866/GAR 515,571
DE85000928/GAR 515,485
DE85000940/GAR 515,317
DE85000966/GAR 515,477
DE85001169/GAR 515,266
DE85001327/GAR 514,787
DE85001550/GAR 514,988
DE85001669/GAR 514,789
DE85001693/GAR 515,322
DE85001699/GAR 515,323
DE85001701/GAR 515,324
DE85001738/GAR 515,443
DE85001893/GAR 515,204
DE85002198/GAR 515,382
DE85002326/GAR 515,382
DE85002459/GAR 515,447
DE85002460/GAR 515,654
DE85002467/GAR 515,070
DE85002468/GAR 515,448
DE85002469/GAR 515,449
DE85002472/GAR 515,357
DE85002477/GAR 514,528
DE85002487/GAR 515,331
DE85002498/GAR 515,554
DE85002557/GAR 515,660
DE85002559/GAR 514,529
DE85002561/GAR 515,332
DE85002565/GAR 515,486
DE85002593/GAR 515,208
DE85002594/GAR 515,358
Search Technology, Inc., Norcross, GA.
DE85000677/GAR 515,346
Tennessee Univ., Knoxville.
DE85001135/GAR 515,438
Union Carbide Corp., Oak Ridge, TN. Computer Sciences Div.
DE85002300/GAR 515,121
Varian Associates, Inc., Palo Alto, CA.
DE85000599/GAR 515,314
DE85002568/GAR 515,333
Zaninger Engineering Co., San Jose, CA.
DE85000166/GAR 515,343

AC05-84OT21400
Oak Ridge Gaseous Diffusion Plant, TN.
DE84016809/GAR 515,473
DE85000403/GAR 515,202

AC06-76FF02170
Hanford Engineering Development Lab., Richland, WA.
DE85000294/GAR 514,428
DE85001069/GAR 515,437
DE85001071/GAR 514,987
DE85001194/GAR 515,380
DE85001203/GAR 514,444
DE85001215/GAR 515,440
DE85001407/GAR 515,321
DE85002236/GAR 515,444
DE85002237/GAR 515,205
DE85002240/GAR 515,353

AC06-76RL01830
Battelle Pacific Northwest Labs., Richland, WA.
DE84013162/GAR 515,429
DE85000288/GAR 514,953
DE85000360/GAR 515,176
DE85000777/GAR 515,392
DE85000826/GAR 515,395
DE85000827/GAR 515,623
DE85000828/GAR 515,396
DE85000833/GAR 515,397
DE85000834/GAR 515,398
DE85000838/GAR 514,615
DE85000841/GAR 514,655
DE85001456/GAR 514,935
DE85002155/GAR 514,571
DE85002375/GAR 515,410
DE85002376/GAR 515,411
DE85002377/GAR 515,019
DE85002444/GAR 515,385
DE85002660/GAR 515,661
DE85002661/GAR 515,209
DE85002671/GAR 515,416
DE85002792/GAR 514,943
DE85003109/GAR 514,915
DE85003152/GAR 514,917
National Bureau of Standards, Gaithersburg, MD. Center for Materials Science.
DE85000830/GAR 515,521

AC06-77RL01030
Rockwell International, Richland, WA. Rockwell Hanford Operations.
DE85000558/GAR 515,391
DE85001222/GAR 515,400
DE85001454/GAR 515,478
DE85002502/GAR 515,414

AC07-76ID01570
EG and G Idaho, Inc., Idaho Falls.
DE85002516/GAR 515,480
Pennsylvania State Univ., University Park. Inst. for Research on Land and Water Resources.
DE85002330/GAR 515,405
DE85002331/GAR 515,406
DE85002332/GAR 515,407
DE85002333/GAR 515,408

AC07-84ID12435
Westinghouse Idaho Nuclear Co., Inc., Idaho Falls.
DE85000193/GAR 515,475

AC08-80NV10081
Magma Gulf/Technadril, Houston, TX.
DE84016037/GAR 514,880

AC11-78PN00014
Bettis Atomic Power Lab., West Mifflin, PA.
DE85001395/GAR 515,401

AC18-84FC10614
Brigham Young Univ., Provo, UT. Combustion Lab.
DE85002496/GAR 515,658

AC19-78BC00046
ERCO Petroleum Services, Inc., Houston, TX.
DE85003173/GAR 514,679

AC19-81BC10328
HRI, Inc., Miami, FL.
DE85000176/GAR 515,613

AC19-84BC90880
National Inst. for Petroleum and Energy Research, Bartlesville, OK.
DE85002161/GAR 515,635

AC21-79MC10509
Texas A and M Univ., College Station.
DE85000109/GAR 514,759

AC21-80ET15492
Air Pollution Technology, Inc., San Diego, CA.
DE85001015/GAR 515,088

AC21-80MC14129
National Coal Board, Leatherhead (England). Coal Utilization Research Lab.
DE84012001/GAR 515,061
DE84012002/GAR 515,083

AC21-82MC19207
Massachusetts Inst. of Tech., Cambridge.
DE85002492/GAR 515,655

AC21-83MC20334
Massachusetts Inst. of Tech., Cambridge.
DE85000215/GAR 515,682

AC21-83MC20693
Colorado School of Mines, Golden. Dept. of Chemical and Petroleum Refining Engineering.
DE85002698/GAR 515,663

AC22-79ET15529
Westinghouse Electric Corp., Pittsburgh, PA. Advanced Energy Systems Div.
DE85002156/GAR 514,938

AC22-80ET15614
Avco-Everett Research Lab., Inc., Everett, MA.
DE85001515/GAR 514,936
DE85001516/GAR 514,937

AC22-82PC50041
Catalytic, Inc., Wilsonville, AL.
DE85002138/GAR 515,634

AC22-83PC60265
Science Applications, Inc., San Diego, CA.
DE85000754/GAR 515,087

AC22-84PC70507
Avco-Everett Research Lab., Inc., Everett, MA.
DE85000760/GAR 514,932

AC79-83BP39209
Bechtel Group, Inc., San Francisco, CA.
DE85000186/GAR 514,895

AC79-83BP39950
Harris (Louis) and Associates, Inc., New York.
DE85000486/GAR 514,897
DE85000490/GAR 514,898

AFOSR-78-3675
National Bureau of Standards, Gaithersburg, MD.
PB85-144913 515,243

AFOSR-81-0087
Ohio State Univ., Columbus. Dept. of Microbiology.
AD-A148 875/8/GAR 514,632

AFOSR-82-0052
University Coll., London (England). Dept. of Physics and Astronomy.
AD-A149 029/1/GAR 514,404

AFOSR-82-0276
Yale Univ., New Haven, CT. Dept. of Mechanical Engineering.
AD-A149 071/3/GAR 515,577

AFOSR-82-0302
Princeton Univ., NJ. Dept. of Chemical Engineering.
AD-A149 011/9/GAR 514,688

AFOSR-82-0306
Istituto di Ricerche Farmacologiche Mario Negri, Milan (Italy).
AD-A148 973/1/GAR 514,640

AFOSR-83-0033
Carnegie-Mellon Univ., Pittsburgh, PA. Dept. of Mechanical Engineering.
AD-A149 074/7/GAR 515,600

AFOSR-83-0155
Clemson Univ., SC. Dept. of Psychology.
AD-A148 912/9/GAR 514,645

AFOSR-83-0319
Emory Univ., Atlanta, GA. Dept. of Mathematics and Computer Science.
AD-A149 026/7/GAR 515,023

AFOSR-84-0069
Texas Univ. at Austin. Dept. of Electrical and Computer Engineering.
AD-A148 964/0/GAR 515,020

AI01-76PR06010
National Bureau of Standards (NEL), Gaithersburg, MD.
DE85000850/GAR 515,067

AI01-81CS50271
Booz-Allen and Hamilton, Inc., Bethesda, MD. Transportation Consulting Div.
DE85000994/GAR 515,691

AI01-81ER60028
National Research Council, Washington, DC.
DE85001845/GAR 514,413

AI01-81FE00016
Foster-Miller Associates, Inc., Waltham, MA. Energy Systems Group.
DE85002322/GAR 514,765

AI01-81RA50624
Jet Propulsion Lab., Pasadena, CA.
DE85001028/GAR 515,624

AI04-80AL12726
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
DE85000993/GAR 514,954

AI08-78ET44802
Geological Survey, Denver, CO.
DE85002656/GAR 515,415

Geological Survey, Menlo Park, CA.
DE85000260/GAR 515,389

AI22-78ET11417
Arnold Engineering Development Center, Arnold AFS, TN.
DE85000854/GAR 514,934

AID/AFR-C-1489
Checchi and Co., Washington, DC.
PB85-143121/GAR 514,557
PB85-144228/GAR 514,357
PB85-144558/GAR 514,575
PB85-144566/GAR 514,483
PB85-144574/GAR 514,484
PB85-144582/GAR 514,608
PB85-144590/GAR 514,576
PB85-144624/GAR 514,358
PB85-144996/GAR 514,485

AID/AFR-G-1261
Michigan State Univ., East Lansing. Dept. of Agricultural Economics.
PB85-145688/GAR 514,360

AID/ASIA-C-1456
Minnesota Univ., St. Paul. Economic Development Center.
PB85-141836/GAR 514,372

AID/CSD-2457
Arizona Univ., Tucson.
PB85-141711/GAR 515,098

AID/CSD-2834
New York State Coll. of Agriculture and Life Sciences, Ithaca.
PB85-143782/GAR 514,377

AID/CSD-3606
International Statistical Inst., Voorburg (Netherlands).
PB85-141828/GAR 514,554

World Fertility Survey, London (England).
PB85-138030/GAR 514,550

AID/DSAN-C-0008
Michigan State Univ., East Lansing. Dept. of Agricultural Economics.
PB85-145696/GAR 514,609

AID/DSAN-C-0058
Utah State Univ., Logan. Dept. of Agricultural and Irrigation Engineering.
PB85-140218/GAR 514,363

AID/DSAN-C-0063
National Demonstration Water Project, Washington, DC.
PB85-144723/GAR 515,110

AID/DSAN-G-0101
Puerto Rico Univ., Mayaguez.
PB85-143105/GAR 514,375

AID/DSPE-C-0025
North Carolina Univ. at Chapel Hill. Labs. for Population Statistics.
PB85-140119/GAR 514,551

AID/DSPE-C-0080
Water and Sanitation for Health Project, Arlington, VA.
PB85-143022/GAR 515,101

AID/NE-C-1351
Consortium for International Development, Tucson, AZ.
PB85-141661/GAR 514,350

AID/OTR-G-1822
RAND Corp., Santa Monica, CA.
PB85-141653/GAR 514,607
PB85-143709/GAR 514,355
PB85-143774/GAR 514,558

AID/OTR-0092-C-00-2280-00
Denver Research Inst., CO.
PB85-147791/GAR 514,491

AID/PHA-C-1177
Chicago Univ., IL. Community and Family Study Center.
PB85-145670/GAR 514,593

AID/SOD/PDC-G-0176
Instituto de Investigacion y Formacion Cooperativista, Tegucigalpa (Honduras).
PB85-133635/GAR 514,346

AID/TA-C-3
Michigan State Univ., East Lansing. Dept. of Agricultural Economics.
PB85-145688/GAR 514,360

AID/TA-C-1466
International Rice Research Inst., Los Banos, Laguna (Philippines). Agricultural Engineering Dept.
PB85-141646/GAR 514,364

AID/TA-G-1218
International Fertilizer Development Center, Florence, AL.
PB85-144301/GAR 514,367

AM04-80AL13137
Jet Propulsion Lab., Pasadena, CA.
DE85000335/GAR 515,616
DE85000336/GAR 515,617

AP08-83NV10305
National Bureau of Standards, Washington, DC.
DE84016028/GAR 514,614

AS05-76CS40069
Tennessee Univ., Knoxville. Energy, Environment and Resources Center.
DE85000646/GAR 514,901

AS05-78ET20067
Arizona Univ., Tucson. Dept. of Chemical Engineering.
DE85001688/GAR 515,630

AS05-80ER10585
Tennessee Univ., Knoxville. Nondestructive Evaluation Div.
DE85000435/GAR 515,518

Wyoming Univ., Laramie.
DE85001085/GAR 515,522

AS05-80ER10711
Virginia Polytechnic Inst. and State Univ., Blacksburg. Center for Transport Theory and Mathematical Physics.
DE85000848/GAR 515,037

AS07-80ID12167
Idaho Univ., Moscow. Dept. of Chemical Engineering.
DE85000496/GAR 514,899

AS08-82NV10295
Nevada Bureau of Mines and Geology, Reno.
DE85000845/GAR 514,743

AS19-82BC10660
Illinois Inst. of Tech., Chicago.
DE85002760/GAR 515,664

AT03-76ER70262
California Univ., Santa Barbara. Dept. of Chemistry.
DE85000811/GAR 515,622

AT03-76ER72018
Stanford Univ., CA. Systems Optimization Lab.
DE85002811/GAR 514,462

AT03-84SF11982
GA Technologies, Inc., San Diego, CA.
DE85000864/GAR 515,476

CX-5000-9-5950
Soil Systems, Inc., Marietta, GA.
AD-A148 985/5/GAR 514,508

DAAB07-83-C-K514
SofTech, Inc., Waltham, MA.
AD-A148 855/0/GAR 514,801

DAAG29-80-C-0041
Wisconsin Univ.-Madison. Mathematics Research Center.
AD-A149 040/8/GAR 514,783
AD-A149 043/2/GAR 515,576
AD-A149 044/0/GAR 515,025
AD-A149 045/7/GAR 515,026
AD-A149 046/5/GAR 515,027
AD-A149 068/9/GAR 515,529
AD-A149 069/7/GAR 515,031
AD-A149 092/9/GAR 515,033
AD-A149 093/7/GAR 515,034
AD-A149 094/5/GAR 515,035
AD-A149 095/2/GAR 515,036

DAAG29-83-C-0004
S and D Dynamics, Inc., Huntington, NY.
AD-A149 022/6/GAR 515,507

DAAG46-83-K-0163
Georgia Inst. of Tech., Atlanta. Energy and Material Sciences Lab.
AD-A148 972/3/GAR 515,145

DAAK10-82-C-0112
Ammann and Whitney, New York.
AD-A148 895/6/GAR 515,190

DAJA45-82-C-0009
Inform G.m.b.H., Aachen (Germany, F.R.).
AD-A149 012/7/GAR 515,051

DAJA45-83-C-0044
Imperial Software Technology Ltd., London (England).
AD-A148 888/1/GAR 514,804

DAMD17-75-C-5036
Bio-Med, Inc., College Park, MD.
AD-A148 919/4/GAR 514,638

DAMD17-76-C-6026
Yale Univ., New Haven, CT. School of Medicine.
AD-A149 031/7/GAR 514,641

DAMD17-80-G-9469
Hadassah Medical School, Jerusalem (Israel).
AD-A148 857/6/GAR 514,637

DAMD17-81-C-1174
Jacksonville State Univ., AL.
AD-A148 903/8/GAR 514,514

DAMD17-81-C-1183
Kansas Univ. Medical Center, Kansas City. Dept. of Medicine.
AD-A148 928/5/GAR 514,639

DAMD17-82-C-2004
Pennsylvania Univ., Philadelphia.
AD-A149 058/0/GAR 514,635

DAMD17-82-C-2100
SRI International, Menlo Park, CA.
AD-A148 978/0/GAR 515,493

DAMD17-83-G-9534
Pittsburgh Univ., PA.
AD-A148 914/5/GAR 514,646

DE-AC02-76CH00016
Brookhaven National Lab., Upton, NY.
NUREG/CR-3498/GAR 515,451

DE-AC04-76DP00789
Sandia National Labs., Albuquerque, NM.
NUREG/CR-3780/GAR 515,482
NUREG/CR-3816-V1/GAR 515,455
NUREG/CR-3936/GAR 515,457

DE-AC05-84OR21400
Oak Ridge National Lab., TN.
NUREG/CR-3728/GAR 514,989
NUREG/CR-3744-V2/GAR 515,453
NUREG/CR-3830-V2/GAR 515,424
NUREG/CR-3885-V2/GAR 515,456
NUREG/CR-3949-V1/GAR 515,177
NUREG/CR-4031/GAR 514,991

DE-AC07-76IDO1570
EG and G Idaho, Inc., Idaho Falls.
NUREG/CR-0169-V22/GAR 515,450
NUREG/CR-3994/GAR 515,425
NUREG/CR-4017/GAR 515,458
NUREG/CR-4056/GAR 515,420

CONTRACT/GRANT NUMBER INDEX

NUREG/CR-4115/GAR *515,460*

DE-AI01-76PR06010
National Bureau of Standards (NEL), Gaithersburg, MD. Center for Building Technology.
PB85-153443/GAR *515,076*

DE-AI01-77CS-51040
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
N85-13007/8/GAR *515,692*

DE-AI01-78CS-54209
Jet Propulsion Lab., Pasadena, CA.
N85-13245/4/GAR *515,604*

DE-AI01-79ET-20485
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
N85-13157/1/GAR *514,944*

DE-AI03-79ET-37116
Jet Propulsion Lab., Pasadena, CA.
N85-13372/6/GAR *514,946*

DE-AM04-86AL-13137
Jet Propulsion Lab., Pasadena, CA.
N85-13375/9/GAR *514,920*

N85-13376/7/GAR *514,921*

DEN3-261
Cummins Engine Co., Inc., Columbus, IN.
N85-13235/5/GAR *515,693*

DHHS-100-81-0068
Northwest Regional Educational Lab., Portland, OR.
SHR-0012016/GAR *514,513*

DL-99-3-0805-77-086-01
Mathematica Policy Research, Inc., Princeton, NJ.
PB85-146702/GAR *514,539*

DMTA91-83-C-30045
Manalytics, Inc., San Francisco, CA.
PB85-146579/GAR *514,490*

DRET-82/318
Institut Franco-Allemand de Recherches, Saint-Louis (France).
N85-12872/6/GAR *514,324*

DRET-83-34-135
Office National d'Etudes et de Recherches Aerospatiales, Paris (France).
N85-13682/8/GAR *514,325*

DT-FA01-83-Y-10554
Computer Technology Associates, Inc., Englewood, CO.
AD-A148 881/6/GAR *514,903*

DTMA91-83-C-30045
Manalytics, Inc., San Francisco, CA.
PB85-146553/GAR *514,488*

PB85-146561/GAR *514,489*

DTNH22-C-81-07256
Calspan Advanced Technology Center, Buffalo, NY.
PB85-136372/GAR *515,129*

EDA-99-7-13527
Faucett (Jack) Associates, Inc., Chevy Chase, MD.
PB85-146108/GAR *514,487*

EF-77-C-01-2707
Systems Consultants, Inc., Washington, DC.
FE-2707-T1(V.2)/GAR *514,767*

EPA-CS-809411
MacNeill (John S.), Jr., Homer, NY.
PB85-143287/GAR *515,102*

EPA-R-805184
North Carolina Univ. at Chapel Hill. School of Medicine.
PB85-144087 *514,650*

PB85-144095 *514,591*

EPA-R-807932
Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Biology.
PB85-144079 *514,671*

EPA-68-01-6312
Engineering-Science, Inc., Durham, NC.
PB85-143261/GAR *514,713*

EPA-68-02-3110
Westinghouse Research and Development Center, Pittsburgh, PA.
PB85-152973/GAR *515,114*

EPA-68-02-3396
Clement Associates, Inc., Arlington, VA.
PB85-142016/GAR *514,670*

EPA-68-02-3487
Battelle Columbus Labs., OH.
PB85-144046/GAR *515,239*

EPA-68-02-3829
S-Cubed, La Jolla, CA.
PB85-152650/GAR *515,113*

EPA-68-02-3791
SRI International, Menlo Park, CA.
PB85-144145/GAR *515,104*

EPA-68-03-2054
Factory Mutual Research Corp., Norwood, MA.
PB85-138642/GAR *515,236*

EPA-68-03-3136
Life Systems, Inc., Cleveland, OH.
PB85-143279/GAR *515,238*

PB85-143766/GAR *514,714*

F19628-80-C-0002
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
AD-A149 001/0/GAR *514,782*

F19628-83-K-0004
Maryland Univ., College Park. Dept. of Physics and Astronomy.
AD-A149 018/4/GAR *514,385*

F33615-76-C-0605
Texas Univ. at Austin. Dept. of Biomedical Engineering.
AD-A148 977/2/GAR *514,654*

F33615-80-C-0512
California Univ., Irvine.
AD-A148 952/5/GAR *514,669*

F33615-80-C-0607
Texas Univ. Health Science Center at San Antonio. Dept. of Radiology.
AD-A148 866/7/GAR *514,652*

AD-A148 867/5/GAR *514,653*

F33615-80-D-4002
Utah Univ. Research Inst., Salt Lake City. UBTL Div.
AD-A149 013/5/GAR *514,742*

F33615-81-K-3034
Tennessee Univ. Space Inst., Tullahoma. Gasdynamics Div.
AD-A148 981/4/GAR *514,314*

F33615-82-K-5106
Massachusetts Inst. of Tech., Cambridge. Artificial Intelligence Lab.
AD-A148 962/4/GAR *515,163*

F49620-79-C-0206
Drexel Univ., Philadelphia, PA. Dept. of Mechanical Engineering and Mechanics.
AD-A149 037/4/GAR *514,971*

F49620-82-C-0009
North Carolina Univ. at Chapel Hill. Dept. of Statistics.
AD-A148 975/6/GAR *515,021*

FC01-83FE60149
National Inst. for Petroleum and Energy Research, Bartlesville, OK.
DE85001825/GAR *515,631*

DE85002180/GAR *514,764*

DE85002181/GAR *515,636*

FC03-77SF10501
Southern California Edison Co., Rosemead.
DE85001377/GAR *514,788*

FC04-77ET20216
Georgia Power Co., Atlanta.
DE85001486/GAR *514,904*

FC07-80ID12126
Central Maine Power Co., Augusta.
DE85002670/GAR *514,942*

FC08-79NV10033
Tennessee Univ., Knoxville. Transportation Center.
DE85002167/GAR *515,601*

FC22-83FE60339
Southern Illinois Univ. at Carbondale. Coal Extraction and Utilization Research Center.
DE85001891/GAR *515,632*

FG01-81RA50625
United Nations Inst. for Training and Research, New York.
DE85001846/GAR *514,906*

FG01-82CE15135
Whetstone Branch Living School, Ferrum, VA.
DE84017335/GAR *515,063*

FG01-82CE15143
Lin (Ping-Wha), Angola, IN.
DE84017333/GAR *515,084*

FG02-84CH10211
Tuskegee Inst., AL.
DE85001412/GAR *514,370*

FG02-84ER13217
Colorado Univ. at Boulder. Dept. of Chemical Engineering.
DE85000424/GAR *515,619*

FG02-84ER13218
Illinois Univ. at Urbana-Champaign. School of Chemical Sciences.
DE85002968/GAR *514,700*

FG05-77ET20164
Michigan Univ., Ann Arbor.
DE85001483/GAR *514,412*

FG05-82ER10278
Wisconsin Univ.-Superior. Center for Lake Superior Environmental Studies.
DE85000602/GAR *514,527*

FG05-83ER54025
National Research Council, Washington, DC. Energy Engineering Board.
DE85002392/GAR *515,390*

FG05-83OR21390
North Central Forest Experiment Station, St. Paul, MN.
DE85000178/GAR *515,614*

FG07-83ID12478
Oregon Inst. of Tech., Klamath Falls. Geo-Heat Center.
DE85002329/GAR *514,909*

FG22-81PC40797
Rhode Island Univ., Kingston. Dept. of Chemical Engineering.
DE85001312/GAR *515,627*

FG22-82PC50795
Arizona Univ., Tucson. Dept. of Chemical Engineering.
DE85000351/GAR *515,618*

FG22-82PC50804
Purdue Univ., Lafayette, IN.
DE85000025/GAR *515,607*

FG22-83PC60782
Stanford Univ., CA. Dept. of Chemical Engineering.
DE85002800/GAR *515,665*

FG22-83PC60802
Arizona Univ., Tucson. Dept. of Chemical Engineering.
DE85003188/GAR *515,667*

FG22-84PC70765
Carnegie-Mellon Univ., Pittsburgh, PA. Dept. of Chemical Engineering.
DE85003172/GAR *514,766*

FG44-80R410210
Winship (Catherine T.), Winston-Salem, NC.
DE85000217/GAR *514,952*

FG44-81R410416
ENTEC Research and Development Co., Knoxville, TN.
DE85000309/GAR *514,362*

FG44-81R410440
Twin Chimney Solar Designs, Winston-Salem, NC.
DE85001152/GAR *515,068*

FG44-81R410495
Vodra (Richard), Destin, FL.
DE85000376/GAR *515,064*

FMV-FLYGFL-82223-80-183-21-001
Aeronautical Research Inst. of Sweden, Stockholm.
N85-13279/3/GAR *515,579*

FMV-FLYGFL-82260-83-053-25-001
Aeronautical Research Inst. of Sweden, Stockholm.
N85-12879/1/GAR *515,219*

G1018
Illinois State Geological Survey Div., Champaign.
NUREG/CR-4036/GAR *514,744*

GRI-5014-363-0235
Pennsylvania State Univ., University Park. Dept. of Materials Science and Engineering.
PB85-155984/GAR *515,673*

GRI-5080-344-0308
United Technologies Corp., South Windsor, CT. Power Systems Div.
PB85-151322/GAR *514,926*

GRI-5080-351-0353
Roth (H. Daniel) Associates, Inc., Rockville, MD.
PB85-149714/GAR *514,674*

GRI-5080-353-0337
Foster-Miller, Inc., Waltham, MA.
PB85-152817/GAR *515,124*

GRI-5081-212-0560
Eaton Operating Co., Inc., Houston, TX.
PB85-156974/GAR *514,769*

GRI-5081-260-0584
Brookhaven National Lab., Upton, NY.
PB85-155976/GAR *514,726*

GRI-5081-263-0600
General Electric Corporate Research and Development, Schenectady, NY.
PB85-149698/GAR *514,718*

GRI-5081-271-0601
Precision Machine Products, Inc., Dallas, TX.
PB85-149748/GAR *514,925*

GRI-5081-323-0463
Institute of Gas Technology, Chicago, IL.
PB85-159457/GAR *515,676*

GRI-5082-223-0567
Institute of Gas Technology, Chicago, IL.
PB85-156958/GAR *515,674*

GRI-5082-260-0618
Southern Illinois Univ. at Carbondale. Dept. of Geology.
PB85-154722/GAR *515,672*

GRI-5082-260-0642
Ohio State Univ. Research Foundation, Columbus.
PB85-151330/GAR *514,717*

GRI-5082-260-0658
Brown Univ., Providence, RI.

PB85-152833/GAR 515,015

GRI-5083-226-0773
Institute of Gas Technology, Chicago, IL.
PB85-156966/GAR 515,675

GRI-5083-260-0881
Eltron Research, Inc., Aurora, IL.
PB85-149706/GAR 514,730

HCFA-11-97388-1
Massachusetts Dept. of Public Welfare, Boston.
PB85-146116/GAR 514,595

HCFA-18-98220
American Public Welfare Association, Washington, DC.
PB85-145829/GAR 514,581

MDA903-82-C-0434
National Materials Advisory Board (NRC), Washington, DC.
AD-A149 010/1/GAR 515,125

MDA903-83-C-0018
Plog Research, Inc., Reseda, CA.
AD-A148 910/3/GAR 514,543

MDA903-83-C-0033
Army Research Inst. for the Behavioral and Social Sciences, Alexandria, VA.
AD-A148 911/1/GAR 514,516

MDA903-84-C-0031
Institute for Defense Analyses, Alexandria, VA.
AD-A149 039/0/GAR 514,972

N01-HL-1-9135
Washington Univ., Seattle. Center for Bioengineering.
PB85-142727/GAR 514,649

N00014-75-C-0571
New York Univ., NY. Courant Inst. of Mathematical Sciences.
AD-A148 969/9 515,050

N00014-75-C-0694
Arizona Univ., Tucson. Engineering Experiment Station.
AD-A148 932/7/GAR 515,587

N00014-76-C-0475
Stanford Univ., CA. Dept. of Statistics.
AD-A149 014/3/GAR 515,022
AD-A149 015/0/GAR 515,052

N00014-76-C-0815
New Mexico Univ., Albuquerque. School of Medicine.
AD-A148 889/9/GAR 514,644

N00014-77-C-0305
Tulane Univ., Covington, LA. Delta Regional Primate Research Center.
AD-A149 077/0/GAR 514,665

N00014-77-C-0366
IBM Thomas J. Watson Research Center, Yorktown Heights, NY.
AD-A148 933/5/GAR 515,584

N00014-77-C-0532
Massachusetts Inst. of Tech., Cambridge. Lab. for Information and Decision Systems.
AD-A148 922/8/GAR 515,307

N00014-78-C-0584
Georgetown Univ., Washington, DC. Dept. of Physics.
AD-A148 979/8/GAR 515,514

N00014-79-C-0071
Woods Hole Oceanographic Institution, MA.
AD-A148 930/1/GAR 514,740

N00014-79-C-0127
Systems Control, Inc., (VT), Palo Alto, CA.
AD-A148 913/7/GAR 514,806

N00014-79-C-0439
Massachusetts Univ., Amherst. Dept. of Computer and Information Science.
AD-A148 859/2/GAR 514,422
AD-A148 926/9 514,808
AD-A149 064/8/GAR 514,815
AD-A149 065/5/GAR 514,816

N00014-79-C-0472
Scripps Institution of Oceanography, La Jolla, CA. Marine Physical Lab.
AD-A148 971/5/GAR 515,528

N00014-79-C-0632
Texas Christian Univ., Fort Worth. Dept. of Chemistry.
AD-A149 042/4/GAR 514,683
AD-A149 066/3/GAR 514,684

N00014-79-C-0683
Columbia Univ., New York. Dept. of Chemistry.
AD-A149 084/6/GAR 514,690

N00014-80-C-0455
Pittsburgh Univ., PA. Inst. for Computational Mathematics and Applications.
AD-A148 880/8/GAR 514,802

N00014-80-C-0505
Massachusetts Inst. of Tech., Cambridge. Artificial Intelligence Lab.
AD-A148 956/6/GAR 515,162
AD-A148 961/6/GAR 515,049
AD-A148 987/1/GAR 514,810
AD-A148 989/7/GAR 514,545

Massachusetts Inst. of Tech., Cambridge. Lab. for Computer Science.
AD-A148 990/5/GAR 514,811

N00014-80-C-0614
KMS Fusion, Inc., Ann Arbor, MI.
AD-A148 951/7/GAR 515,543

N00014-80-F-0016
National Bureau of Standards, Washington, DC.
AD-A148 920/2/GAR 515,197

N00014-80-K-0969
Illinois Univ. at Urbana-Champaign. Dept. of Ceramic Engineering.
AD-A149 082/0/GAR 514,958

N00014-81-C-0009
Woods Hole Oceanographic Institution, MA.
AD-A148 876/6/GAR 514,735
AD-A148 931/9/GAR 514,752

N00014-81-C-0494
Massachusetts Inst. of Tech., Cambridge. Artificial Intelligence Lab.
AD-A148 956/6/GAR 515,162

N00014-81-F-0009
National Bureau of Standards, Washington, DC.
AD-A148 920/2/GAR 515,197
AD-A148 921/0/GAR 515,513

N00014-81-K-0144
Rhode Island Univ., Kingston. Dept. of Electrical Engineering.
AD-A148 856/8/GAR 514,855
AD-A148 879/0/GAR 514,856

N00014-81-K-0494
Massachusetts Inst. of Tech., Cambridge. Artificial Intelligence Lab.
AD-A148 961/6/GAR 515,049

N00014-81-K-0742
Massachusetts Inst. of Tech., Cambridge. Research Lab. of Electronics.
AD-A148 963/2/GAR 514,809

N00014-82-C-0019
Woods Hole Oceanographic Institution, MA.
AD-A148 927/7/GAR 514,736
AD-A148 930/1/GAR 514,740

N00014-82-C-0251
BDM Services Co., Monterey, CA.
AD-A149 036/6/GAR 514,814

N00014-82-C-0404
Florida State Univ., Tallahassee. Dept. of Oceanography.
AD-A148 918/6/GAR 514,731

Florida State Univ., Tallahassee. Mesoscale Air-Sea Interaction Group.
N85-13448/4/GAR 514,776

N00014-82-F-0004
National Bureau of Standards, Washington, DC.
AD-A148 921/0/GAR 515,513

N00014-82-K-0050
Lehigh Univ., Bethlehem, PA. Coxe Lab.
AD-A148 993/9/GAR 515,017

N00014-82-K-0381
New York Univ., NY. Courant Inst. of Mathematical Sciences.
AD-A148 969/9 515,050

N00014-82-K-0523
Minnesota Univ., Minneapolis. Dept. of Mechanical Engineering.
AD-A149 063/0/GAR 515,059

N00014-82-K-0588
Scripps Institution of Oceanography, La Jolla, CA. Marine Physical Lab.
AD-A148 877/4/GAR 515,253

N00014-82-K-1054
Yale Univ., New Haven, CT. Dept. of Computer Science.
AD-A149 007/7/GAR 514,813

N00014-83-C-0108
Eltron Research, Inc., Naperville, IL.
AD-A148 982/2/GAR 514,686

N00014-83-C-0170
IBM Research Lab., San Jose, CA.
AD-A149 080/4/GAR 515,200

N00014-83-C-0447
General Electric Corporate Research and Development, Schenectady, NY.
AD-A148 960/8/GAR 514,970

N00014-83-C-0484
NDT Technologies, Inc., South Windsor, CT.
AD-A149 016/8/GAR 514,985

N00014-83-C-2184
Geo-Centers, Inc., Newton Upper Falls, MA.
AD-A149 041/6/GAR 514,689

N00014-83-K-0238
Stanford Univ., CA. Dept. of Statistics.
AD-A149 015/0/GAR 515,052

N00014-83-K-0471
Cornell Univ., Ithaca, NY. Dept. of Materials Science and Engineering.
AD-A149 062/2/GAR 515,010

N00014-83-K-0472
Stanford Univ., CA. Lab. for Computational Statistics.
AD-A149 032/5/GAR 515,024

N00014-83-K-0551
Maryland Univ., College Park. Dept. of Psychology.
AD-A148 907/9/GAR 514,542

N00014-83-K-0611
Kentucky Univ., Lexington. Dept. of Chemistry.
AD-A148 980/6/GAR 514,682
AD-A148 995/4/GAR 514,687

N00014-84-C-0058
Spectron Development Labs., Inc., Costa Mesa, CA.
AD-A149 078/8/GAR 515,550

N00014-84-C-0789
Machine Design Engineers, Inc., Kent, WA.
AD-A149 038/2/GAR 515,164

N00019-83-C-0133
California Univ., San Diego, La Jolla. Dept. of Electrical Engineering and Computer Sciences.
AD-A148 891/5/GAR 515,583

N00024-83-C-5301
Johns Hopkins Univ., Laurel, MD. Chemical Propulsion Information Agency.
AD-A148 865/9 515,697

NAG1-115
Massachusetts Univ., Amherst. Dept. of Computer and Information Science.
AD-A148 916/0 514,807

NAG1-166
College of William and Mary, Williamsburg, VA.
N85-13552/3/GAR 515,191

NAG1-296
Michigan Univ., Ann Arbor.
N85-13477/3/GAR 514,824
N85-13478/1/GAR 514,342

NAG1-388
Houston Univ., TX.
N85-13264/5/GAR 514,997

NAG1-483
Vanderbilt Univ., Nashville, TN. School of Engineering.
N85-12870/0/GAR 514,322

NAG2-67
National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
N85-13701/6/GAR 514,389

NAG2-100
Maryland Univ., College Park.
N85-13468/2/GAR 514,642

NAG2-111
Stanford Univ., CA.
N85-12860/1/GAR 514,316

NAG5-32
Johns Hopkins Univ., Baltimore, MD. Dept. of Earth and Planetary Sciences.
N85-13365/0/GAR 514,739

NAG5-51
Oregon State Univ., Corvallis. Dept. of Atmospheric Sciences.
N85-13422/9/GAR 514,415

NAG5-82
Joint Inst. for Lab. Astrophysics, Boulder, CO.
N85-13703/2/GAR 514,391
N85-13704/0/GAR 514,392

NAG5-219
Florida State Univ., Tallahassee. Mesoscale Air-Sea Interaction Group.
N85-13448/4/GAR 514,776

NAG5-234
Illinois Inst. of Tech., Chicago.
N85-13535/8/GAR 514,860

NAG5-263
Maryland Univ., College Park.
N85-13221/5/GAR 515,546

NAG5-268
Kansas Univ./Center for Research, Inc., Lawrence.
N85-13361/9/GAR 515,591

NAG5-303
Pennsylvania State Univ., University Park.
N85-13559/8/GAR 514,707

NAG5-420
California Univ., Berkeley.

CONTRACT/GRANT NUMBER INDEX

N85-13206/8/GAR 515,223

NAGW-48

Louisiana State Univ., Baton Rouge.
N85-13558/0/GAR 514,706

NAGW-115

Hawaii Univ., Honolulu.
N85-13358/5/GAR 514,775

NAGW-122

Washington Univ., St. Louis, MO. Center for the Space Sciences.
N85-13560/6/GAR 515,360

NAGW-240

Princeton Univ., NJ.
N85-12885/0/GAR 515,531

NAGW-253

Smithsonian Astrophysical Observatory, Cambridge, MA.
N85-13762/8/GAR 514,401

NAGW-380

Wisconsin Univ.-Madison.
N85-13526/7/GAR 514,829

N85-13527/5/GAR 514,830

NAGW-397

Smithsonian Astrophysical Observatory, Cambridge, MA.
N85-13699/2/GAR 514,397

NAGW-457

State Univ. of New York at Albany.
N85-13408/8/GAR 514,746

NAGW-504

Cooperative Inst. for Research in the Atmosphere, Fort Collins, CO.
N85-13424/5/GAR 514,416

NAGW-549

California Inst. of Tech., Pasadena.
N85-13706/1/GAR 514,395

NAGW-2781

Stanford Univ., CA.
N85-13760/2/GAR 514,399

NAS1-16132

General Electric Co., Schenectady, NY.
N85-13046/6/GAR 515,018

NAS1-16158

Information and Control Systems, Inc., Hampton, VA.
N85-12900/5/GAR 515,304

NAS1-16202

McDonnell Douglas Corp., Long Beach, CA.
N85-12889/0/GAR 514,341

NAS1-16759

Martin Marietta Aerospace, Denver, CO. Denver Div.
N85-13516/8/GAR 514,629

NAS1-16978

College of William and Mary, Williamsburg, VA.
N85-13552/3/GAR 515,191

NAS1-17070

National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
N85-13528/3/GAR 515,040

NAS1-17368

Ohio Univ., Athens. Avionics Engineering Center.
N85-12885/8/GAR 514,531

NAS1-17539

Boeing Commercial Airplane Co., Seattle, WA.
N85-13269/4/GAR 514,339

N85-13270/2/GAR 514,340

NAS1-17797

Vigyan Research Associates, Inc., Hampton, VA.
N85-12863/5/GAR 514,319

NAS3-19779

National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
N85-13233/0/GAR 515,165

NAS3-21741

Hughes Research Labs., Malibu, CA.
N85-12937/7/GAR 515,603

NAS3-22234

United Technologies Corp., South Windsor, CT.
N85-13371/8/GAR 514,945

NAS3-22514

General Electric Co., Cincinnati, OH.
N85-13550/7/GAR 515,688

NAS3-22535

United Technologies Research Center, East Hartford, CT.
N85-12901/3/GAR 514,337

NAS3-23166

General Electric Co., Cincinnati, OH.
N85-13549/9/GAR 515,687

NAS3-23522

Opcos, Inc., Santa Ana, CA.
N85-13594/5/GAR 515,232

NAS5-26125

Iowa Univ., Iowa City.
N85-12918/7/GAR 514,405

NAS5-28200

SAR, Inc., Riverdale, MD.
N85-13356/9/GAR 514,822

NAS-7-100-956679

Purdue Univ., Lafayette, IN.
DE85002212/GAR 514,939

NAS7-918

Jet Propulsion Lab., Pasadena, CA.
N85-12895/7/GAR 515,685

N85-12905/4/GAR 515,269

N85-12906/2/GAR 515,713

N85-13245/4/GAR 515,604

N85-13372/6/GAR 514,946

N85-13375/9/GAR 514,920

N85-13376/7/GAR 514,921

N85-13445/0/GAR 514,447

N85-13446/8/GAR 514,770

N85-13447/6/GAR 514,733

NAS8-33198

TRW Defense and Space Systems Group, Redondo Beach, CA.
N85-12936/9/GAR 515,719

NAS8-34682

Dayton Univ., OH.
N85-12890/8/GAR 515,683

NAS8-35042

Martin Marietta Aerospace, Denver, CO. Denver Div.
N85-12923/7/GAR 515,708

NAS8-35349

Allied Bendix Aerospace, Teterboro, NJ. Guidance Systems Div.
N85-12931/0/GAR 515,716

Bendix Corp., Teterboro, NJ.
N85-12933/6/GAR 515,718

NAS8-35480

Essex Corp., Huntsville, AL.
N85-12934/4/GAR 514,532

NAS8-35499

Martin Marietta Corp., Bethesda, MD.
N85-12921/1/GAR 515,706

NAS8-35611

McDonnell Douglas Astronautics Co.-West, Huntington Beach, CA.
N85-13473/2/GAR 515,709

N85-13474/0/GAR 515,710

N85-13475/7/GAR 515,711

NAS8-35818

Springborn Labs., Inc., Enfield, CT.
N85-13043/3/GAR 514,681

NAS8-35970

CHAM of North America, Inc., Huntsville, AL.
N85-12859/3/GAR 515,696

NASW-3165

George Washington Univ., Washington, DC.
N85-13469/0/GAR 514,586

NASW-3387

Atmospheric and Environmental Research, Inc., Cambridge, MA.
N85-13759/4/GAR 514,398

NASW-3389

Lunar and Planetary Inst., Houston, TX.
N85-13694/3/GAR 514,386

N85-13709/9/GAR 514,396

NASW-3541

National Aeronautics and Space Administration, Washington, DC.
N85-13689/3/GAR 514,500

NASW-3542

National Aeronautics and Space Administration, Washington, DC.
N85-13008/6/GAR 514,959

N85-13009/4/GAR 514,705

N85-13048/2/GAR 514,962

NCC1-84

North Carolina State Univ. at Raleigh.
N85-12871/8/GAR 514,323

NCC2-100

Kansas Univ./Center for Research, Inc., Lawrence.
N85-12903/9/GAR 515,220

NCC2-150

Stanford Univ., CA.
N85-12861/9/GAR 514,317

NCC2-198

Stanford Univ., CA.
N85-12860/1/GAR 514,316

NCC2-234

Arizona Univ., Tucson.
N85-13357/7/GAR 514,823

NGL-05-002-105

California Inst. of Tech., Pasadena.
N85-13407/0/GAR 514,747

NGL-06-003-057

Joint Inst. for Lab. Astrophysics, Boulder, CO.
N85-13704/0/GAR 514,392

NGL-26-005-001

Washington Univ., St. Louis, MO. Center for the Space Sciences.
N85-13560/6/GAR 515,360

NGL-33-018-003

Rensselaer Polytechnic Inst., Troy, NY.
N85-12966/6/GAR 514,974

NGR-06-002-112

Colorado State Univ., Fort Collins. Dept. of Mechanical Engineering.
N85-12935/1/GAR 515,602

NGT-05-020-412

Stanford Univ., CA.
N85-13663/8/GAR 514,380

NGT-09-011-060

National Aeronautics and Space Administration, Greenbelt, MD. Goddard Space Flight Center.
N85-13664/6/GAR 514,431

NGT-44-005-803

National Aeronautics and Space Administration, Houston, TX. Lyndon B. Johnson Space Center.
N85-13662/0/GAR 514,430

NO1-ES-2-5014

Research Triangle Inst., Research Triangle Park, NC.
PB85-144798/GAR 514,679

NRC-04-81-016

Illinois State Geological Survey Div., Champaign.
NUREG/CR-4036/GAR 514,744

NSF-DMS82-02335

North Carolina Univ. at Chapel Hill. Dept. of Statistics.
AD-A148 975/6/GAR 515,021

NSF-ECS84-04809

Wisconsin Univ.-Madison. Mathematics Research Center.
AD-A149 092/9/GAR 515,033

NSF-MCS78-04212

Massachusetts Univ., Amherst. Dept. of Computer and Information Science.
AD-A148 926/9 514,808

AD-A149 065/5/GAR 514,816

NSF-MCS80-06327

Massachusetts Univ., Amherst. Dept. of Computer and Information Science.
AD-A148 859/2/GAR 514,422

AD-A148 915/2/GAR 514,423

AD-A148 916/0 514,807

AD-A148 917/8/GAR 514,424

AD-A148 925/1/GAR 514,425

NSF-MCS81-16678

Yale Univ., New Haven, CT. Dept. of Computer Science.
AD-A149 007/7/GAR 514,813

NSF-MCS82-10950

Wisconsin Univ.-Madison. Mathematics Research Center.
AD-A149 043/2/GAR 515,576

AD-A149 045/7/GAR 515,026

NSF-MCS83-06327

Massachusetts Univ., Amherst. Dept. of Computer and Information Science.
AD-A149 064/8/GAR 514,815

NSF-PRA81-10724

ECON, Inc., Princeton, NJ.
PB85-150340/GAR 515,294

NSF-PRA84-00689

RAND Corp., Santa Monica, CA.
PB85-150357/GAR 514,437

NSG-1577

Mississippi Remote Sensing Center, Mississippi State.
N85-13529/1/GAR 515,041

NSG-2057

National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
N85-13700/8/GAR 514,388

NSG-2347

Cornell Univ., Ithaca, NY.
N85-13702/4/GAR 514,390

NSG-7304

Harvard Coll. Observatory, Cambridge, MA.
N85-13705/7/GAR 514,393

NSG-7386

Rice Univ., Houston, TX.
N85-13758/6/GAR 514,397

PASA-AG(STR)-4709-6-79
Battelle Columbus Labs., OH.
PB85-140176/GAR *515,671*
Nor'West-Pacific Corp., Bellevue, WA.
PB85-137800/GAR *515,670*

PHS-HRA-232-78-0191
Arizona Univ. Health Sciences Center, Tucson.
HRP-0906079/9/GAR *514,618*

PHS-HRA-232-79-0037
Western Consortium/Western Center for Health Planning, San Francisco, CA.
HRP-0905992/4/GAR *514,445*

PHS-HRA-232-81-0047
Arizona Center for Occupational Safety and Health, Tucson.
HRP-0906070/8/GAR *514,616*
HRP-0906074/0/GAR *514,617*
HRP-0906093/0/GAR *514,619*

PHS-HRSA-232-79-0037
Western Consortium/Western Center for Health Planning, San Francisco, CA.
HRP-0905965/0/GAR *514,584*

PHS-MH-32731
California Univ., San Francisco. School of Medicine.
PB85-147494/GAR *514,597*

PHS-MH-33914
Michigan Univ., Ann Arbor. Inst. for Social Research.
PB85-147452/GAR *514,620*

SABA-4-06114
Faucett (Jack) Associates, Inc., Chevy Chase, MD.
PB85-142024/GAR *514,924*

STPA-80.96.025
Societe Nationale Industrielle Aerospatiale, Suresnes (France). Lab. Central.
N85-13260/3/GAR *515,256*

STPA-83.96.003
Societe Nationale Industrielle Aerospatiale, Suresnes (France). Lab. Central.
N85-12980/7/GAR *514,976*
N85-12981/5/GAR *514,977*

USDA/FS-53-319R-0-135
Nor'West-Pacific Corp., Bellevue, WA.
PB85-137800/GAR *515,670*

USDA/FS-53-319R-0-233
Battelle Columbus Labs., OH.
PB85-140176/GAR *515,671*

W-31-109-ENG-38
Argonne National Lab., IL.
DE84007301/GAR *515,427*
DE84009630/GAR *515,428*
DE84011732/GAR *515,060*
DE84013462/GAR *515,386*
DE84014535/GAR *515,430*
DE84014680/GAR *515,471*
DE84014685/GAR *515,431*
DE84014730/GAR *515,421*
DE84014734/GAR *515,432*
DE84015809/GAR *514,879*
DE84015828/GAR *515,433*
DE85000067/GAR *514,894*
DE85000076/GAR *515,375*
DE85000077/GAR *515,376*
DE85000097/GAR *515,377*
DE85000585/GAR *514,693*
DE85000775/GAR *515,315*
DE85000779/GAR *515,316*
DE85000781/GAR *514,933*
DE85000782/GAR *515,393*
DE85002233/GAR *515,127*
DE85002249/GAR *514,908*
DE85002530/GAR *515,207*
DE85002608/GAR *514,940*
DE85002646/GAR *515,487*
DE85002647/GAR *515,489*
DE85002710/GAR *515,597*
DE85002732/GAR *515,211*
DE85002734/GAR *515,212*
DE85003040/GAR *515,561*
California Inst. of Tech., Pasadena.
DE85002763/GAR *515,560*
UKAEA Risley Nuclear Power Development Establishment (England).
DE84014751/GAR *515,472*
Washington Univ., St. Louis, MO. Edward Mallinckrodt Inst. of Radiology.
DE85000085/GAR *515,147*

W-7405-ENG-36
Los Alamos National Lab., NM.
DE84014042/GAR *514,878*
DE84016813/GAR *515,309*
DE84017212/GAR *515,474*
DE85000174/GAR *515,388*
DE85000175/GAR *515,436*
DE85000300/GAR *515,509*
DE85001406/GAR *515,402*
DE85001523/GAR *515,349*
DE85001538/GAR *515,350*
DE85002017/GAR *515,479*
DE85002050/GAR *515,352*
DE85002246/GAR *514,907*
DE85002345/GAR *515,409*
DE85002347/GAR *515,339*
DE85002351/GAR *515,329*
DE85002384/GAR *515,354*
DE85002385/GAR *515,652*
DE85002388/GAR *515,584*
DE85002409/GAR *515,355*
DE85002412/GAR *515,445*
DE85002416/GAR *515,358*
DE85002421/GAR *515,412*
DE85002435/GAR *515,446*
DE85002437/GAR *514,656*
Scripps Institution of Oceanography, La Jolla, CA. Marine Physical Lab.
AD-A148 971/5/GAR *515,526*

W-7405-ENG-48
General Dynamics/Convair, San Diego, CA.
DE85000964/GAR *515,318*
General Dynamics, San Diego, CA. Convair Div.
DE85000926/GAR *514,786*
DE85001038/GAR *515,319*
Lawrence Livermore National Lab., CA.
DE84017002/GAR *515,496*
DE84017287/GAR *515,311*
DE84017414/GAR *514,785*
DE85000165/GAR *515,086*
DE85000617/GAR *514,443*
DE85000747/GAR *515,344*
DE85000860/GAR *514,583*
DE85001039/GAR *515,499*
DE85001074/GAR *515,203*
DE85001075/GAR *515,379*
DE85001206/GAR *515,347*
DE85001211/GAR *515,320*
DE85001727/GAR *515,325*
DE85001728/GAR *515,326*
DE85001729/GAR *515,327*
DE85001742/GAR *515,328*
DE85002002/GAR *515,338*
DE85002172/GAR *515,267*
DE85002334/GAR *515,563*
Tennessee Valley Authority, Chattanooga. Div. of Conservation and Energy Management.
DE85000037/GAR *514,893*

W-7405-ENG-82
Ames Lab., IA.
DE85002611/GAR *514,678*
Iowa State Univ., Ames. Dept. of Chemical Engineering.
DE85002613/GAR *514,698*

NTIS ORDER/REPORT NUMBER INDEX

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SAMPLE ENTRY

1

Mode of Action of Polyamine Analogues on the Growth and Biochemistry of Leishmanial Cells.
AD-A148 857/6/GAR *514,637* PC **A03/MF A01**

0002AE

Two Photoelectrode Solid-State Photoelectrochemical Cell,
AD-A148 982/2/GAR *514,686* PC **A02/MF A01**

231

An Experimental Investigation of Enhanced Harpacticoid (Copepoda) Abundances Around Isolated Seagrass Shoots.
AD-A148 918/6/GAR *514,731* PC **A02/MF A01**

1248-10

Internal Forced Convection to Low Prandtl Number Gas Mixtures.
AD-A148 932/7/GAR *515,587* PC **A06/MF A01**

A-9824

Application of the Onera Model of Dynamic Stall.
N85-12862/7/GAR *514,318* PC **A04/MF A01**

A-9870

Fiber Optic Data Bus Using Frequency Division Multiplexing (FDM) (Frequency Division Multiplexing) and an Asymmetric Coupler.
N85-13139/9/GAR *515,284* PC **A02/MF A01**

A-9887

Development of Computational Fluid Dynamics at NASA Ames Research Center.
N85-12866/8/GAR *514,320* PC **A02/MF A01**

AAAF-NT-84-01

Calcul d'Ecoulements Internes a Grand Nombre de Reynolds par Resolution Numerique des Equations de Navier-Stokes (Computation of Internal Flows at High Reynolds Number by Numerical Solution of the Navier-Stokes Equations),
PB85-140895/GAR *515,539* PC **E04/MF E04**

AAAF-NT-84-17

Exploitation de Calculs Tridimensionnels dans les Compresseurs Transoniques (Development of Computations of Three Dimensional Flow through Transonic Compressors),
PB85-140903/GAR *515,540* PC **E03/MF E03**

AAAF-NT-84-18

Etudes Aerodynamiques Liees au Developpement des Divergents Deployables (Aerodynamic Studies of Deployment Devices),
PB85-140911/GAR *515,277* PC **E04/MF E04**

AAAF-NT-84-22-B

Precision des Essais de 1/2 Maquettes Motorisees a S2MA (Half Powered Model Tests in the Modane Center),
PB85-141703/GAR *514,326* PC **E04/MF E04**

AD-A148 844/4/GAR

Military and Civilian Lifetime Earnings Comparisons.
AD-A148 844/4/GAR *514,458* PC **A05/MF A01**

AD-A148 845/1/GAR

Skeletal Muscle Metabolism during Exercise is Influenced by Heat Acclimation,
AD-A148 845/1/GAR *514,658* PC **A03/MF A01**

AD-A148 846/9/GAR

Assessment of Muscle Strength and Prediction of Lifting Capacity in U.S. Army Personnel,
AD-A148 846/9/GAR *514,659* PC **A03/MF A01**

AD-A148 847/7/GAR

Food Deprivation and Exercise in the Heat: Thermoregulatory and Metabolic Effects,
AD-A148 847/7/GAR *514,660* PC **A02/MF A01**

AD-A148 848/5/GAR

Hemodynamics Responses to Upright Tilt at Sea Level and High Altitude,
AD-A148 848/5/GAR *514,661* PC **A02/MF A01**

AD-A148 849/3/GAR

Psychophysical Bases for the Sensory Assessment of Rations.
AD-A148 849/3/GAR *514,541* PC **A07/MF A01**

AD-A148 850/1/GAR

Cold Weather 83 Evaluation of the Mobile Food Service Unit and Tray Packs.
AD-A148 850/1/GAR *514,604* PC **A03/MF A01**

AD-A148 851/9/GAR

Strategy, Policy and Contingency Planning. The US Defense Planning Process.
AD-A148 851/9/GAR *515,260* PC **A04/MF A01**

NTIS ORDER/REPORT NUMBER INDEX

AD-A148 852/7/GAR

Centralized Control versus Command Flexibility at the Installation.
AD-A148 852/7/GAR *514,421* PC A03/MF A01

AD-A148 853/5/GAR

Air-Land Battle Interdiction Model Corps Communications Module.
AD-A148 853/5/GAR *515,280* PC A07/MF A01

AD-A148 854/3/GAR

Effects of Perforation L/D Ratio and Slotting on Stick Propellant Combustion.
AD-A148 854/3/GAR *515,490* PC A03/MF A01

AD-A148 855/0/GAR

Ada (Trademark) Primer.
AD-A148 855/0/GAR *514,801* PC A15/MF A01

AD-A148 856/8/GAR

Probability Density of Signal-to-Noise Ratio in an Improved Adaptive Detector. Part 1.
AD-A148 856/8/GAR *514,855* PC A05/MF A01

AD-A148 857/6/GAR

Mode of Action of Polyamine Analogues on the Growth and Biochemistry of Leishmanial Cells.
AD-A148 857/6/GAR *514,637* PC A03/MF A01

AD-A148 858/4/GAR

Laboratory Investigation of Marina Entrances on the Missouri River.
AD-A148 858/4/GAR *515,077* PC A03/MF A01

AD-A148 859/2/GAR

Design of a Knowledge-Based Fault Detection and Diagnosis System.
AD-A148 859/2/GAR *514,422* PC A02/MF A01

AD-A148 860/0/GAR

USAWC (United States Army War College) Military Studies Program. Soviet Merchant Marine.
AD-A148 860/0/GAR *515,172* PC A04/MF A01

AD-A148 861/8/GAR

USAWC (United States Army War College) Military Studies Program. Logistical Support for Chemical Special Ammunition in a Theater of Operations.
AD-A148 861/8/GAR *515,258* PC A02/MF A01

AD-A148 862/6/GAR

Stages and Discharges of the Mississippi River and Tributaries and Other Watersheds in the New Orleans District for 1980.
AD-A148 862/6/GAR *514,751* PC A16/MF A01

AD-A148 863/4/GAR

Spillway Deflectors at Bonneville, John Day and McNary Dams on Columbia River, Oregon-Washington and Ice Harbor, Lower Monumental and Little Goose Dams on Snake River, Washington. Hydraulic Model Investigation.
AD-A148 863/4/GAR *515,078* PC A14/MF A01

AD-A148 864/2/GAR

Dworshak Dam, North Fork Clearwater River, Idaho. Hydraulic Model Investigation.
AD-A148 864/2/GAR *515,079* PC A11/MF A01

AD-A148 865/9

JANNAF(Joint-Army-Navy-NASA-Air Force) Propulsion Systems Hazards Subcommittee Meeting (1984) Held at Army Ballistic Research Laboratory, Aberdeen Proving Ground, Maryland on 18-20 June 1984. Volume 1.
AD-A148 865/9 *515,697* Not available NTIS

AD-A148 866/7/GAR

Genetic Effects of Microwave Exposure on Mammalian Cells In Vitro. Volume 2. Appendix A. Cytogenetics and Growth Kinetics Data, 850 MHz.
AD-A148 866/7/GAR *514,652* PC A03/MF A01

AD-A148 867/5/GAR

Genetic Effects of Microwave Exposure on Mammalian Cells In Vitro. Volume 2. Appendix B. Cytogenetics and Growth Kinetics Data, 1.2 GHz.
AD-A148 867/5/GAR *514,653* PC A04/MF A01

AD-A148 868/3/GAR

Inhalation Toxicity of Manganese Dioxide and a Magnesium Oxide-Manganese Dioxide Mixture.
AD-A148 868/3/GAR *514,667* PC A05/MF A01

AD-A148 869/1/GAR

Squamous Cell Carcinoma with Metastasis in a Rhesus Monkey (Macaca mulatta).
AD-A148 869/1/GAR *514,578* PC A02/MF A01

AD-A148 870/9/GAR

Guidelines for Predicting the Effects of Underwater Explosions on Swimbladder Fish.
AD-A148 870/9/GAR *515,505* PC A03/MF A01

AD-A148 871/7/GAR

Development of a Prototype Wavevector-Frequency Spectral Analysis System.
AD-A148 871/7/GAR *515,512* PC A03/MF A01

AD-A148 872/5/GAR

Counterforce Deadlock: Are Arms Control Agreements Still Possible.
AD-A148 872/5/GAR *514,493* PC A04/MF A01

AD-A148 873/3/GAR

Military Industrial Complex: A Discussion of Selected Issues.
AD-A148 873/3/GAR *514,494* PC A03/MF A01

AD-A148 874/1/GAR

Amphibian Chromomycosis.
AD-A148 874/1/GAR *514,567* PC A02/MF A01

AD-A148 875/8/GAR

Mistranslation of the mRNA Encoding Bacteriophage T7 0.3 Protein.
AD-A148 875/8/GAR *514,632* PC A02/MF A01

AD-A148 876/6/GAR

Tidal Phase Control of Sediment Discharge from the Yangtze River.
AD-A148 876/6/GAR *514,735* PC A02/MF A01

AD-A148 877/4/GAR

Active Baffle Development under ACSAS Task II Hydrophone and Inner Decoupler.
AD-A148 877/4/GAR *515,253* PC A02/MF A01

AD-A148 878/2/GAR

Product Performance Agreement Center Proceedings Held at Dayton, Ohio on 18-19 June 1984.
AD-A148 878/2/GAR *515,263* PC A07/MF A01

AD-A148 879/0/GAR

Methods of Computer-Aided Analysis of Non-Gaussian Noise and Application to Robust Adaptive Detection. Part 2.
AD-A148 879/0/GAR *514,856* MF A01

AD-A148 880/8/GAR

Program Design for an Adaptive, Non-Linear Finite Element Solver.
AD-A148 880/8/GAR *514,802* PC A02/MF A01

AD-A148 881/6/GAR

Sector Suite Man/Machine Functional Capabilities and Performance Requirements.
AD-A148 881/6/GAR *514,803* PC A18/MF A01

AD-A148 882/4/GAR

Individual Differences in Chromatic Brightness Matching.
AD-A148 882/4/GAR *515,549* PC A02/MF A01

AD-A148 883/2/GAR

Relative Effectiveness of Red and White Light for Subsequent Dark-Adaptation.
AD-A148 883/2/GAR *514,662* PC A02/MF A01

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Conference Proceedings of Operational Loads Data Held at Sienna, Italy on 2-6 April 1984.
AD-A149 025/9/GAR *514,329* PC **A14/MF A01**

AD-A149 026/7/GAR

New Methods for Numerical Solution of One Class of Strongly Nonlinear Partial Differential Equations with Applications in Hydrodynamics.
AD-A149 026/7/GAR *515,023* PC **A02/MF A01**

AD-A149 027/5/GAR

Process Modeling Applied to Metal Forming and Thermomechanical Processing.
AD-A149 027/5/GAR *515,146* PC **A08/MF A01**

AD-A149 028/3/GAR

Conference Proceedings of Engine Cyclic Durability by Analysis and Testing.
AD-A149 028/3/GAR *515,680* PC **A13/MF A01**

AD-A149 029/1/GAR

Thermospheric Energy Flux of the Semidiurnal Tide.
AD-A149 029/1/GAR *514,404* PC **A02/MF A01**

AD-A149 030/9/GAR

Explaining the Bay of Pigs and Vietnam, 1965 Decisions.
AD-A149 030/9/GAR *515,271* PC **A06/MF A01**

AD-A149 031/7/GAR

Use of ATP-MgCl2 in the Treatment of Injury and Shock.
AD-A149 031/7/GAR *514,641* PC **A02/MF A01**

AD-A149 032/5/GAR

Smoothing with Split Linear Fits.
AD-A149 032/5/GAR *515,024* PC **A03/MF A01**

AD-A149 033/3/GAR

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AD-A149 034/1/GAR

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AD-A149 035/8/GAR

Proceedings: Third User's Workshop on Combat Stress; Cohesion Held at Fort Sam Houston, Texas on 21-23 September 1983.
AD-A149 035/8/GAR *514,664* PC **A11/MF A01**

AD-A149 036/6/GAR

Data Base Development for Ship Readiness Analyses.
AD-A149 036/6/GAR *514,814* PC **A04/MF A01**

AD-A149 037/4/GAR

Comprehensive Study on Sublaminate Crack Growth Stability and Its Effects on the Load-Carrying Capacity.
AD-A149 037/4/GAR *514,971* PC **A09/MF A01**

AD-A149 038/2/GAR

Development of a Prototype Flat Winding Machine for Winding Air Deployed Fiberoptic Cable.
AD-A149 038/2/GAR *515,164* PC **A02/MF A01**

AD-A149 039/0/GAR

Proceedings of Colloquium/Workshop on Composite Materials and Structures, Standardization, Qualification, Certification Held at Washington, DC on 8-10 May 1984.
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AD-A149 040/8/GAR

Asymptotic Representation of Solutions of the Basic Semiconductor Device Equations.
AD-A149 040/8/GAR *514,783* PC **A04/MF A01**

AD-A149 041/6/GAR

Reaction of Oxygen-Nitrogen Mixtures with Granular Activated Carbons below the Spontaneous Ignition Temperature.
AD-A149 041/6/GAR *514,689* PC **A03/MF A01**

AD-A149 042/4/GAR

Some Addition and Complexation Reactions of a Silylated Amino(Methylene)Phosphine.
AD-A149 042/4/GAR *514,683* PC **A03/MF A01**

AD-A149 043/2/GAR

Recent Developments and Open Problems in the Mathematical Theory of Viscoelasticity.
AD-A149 043/2/GAR *515,576* PC **A02/MF A01**

AD-A149 044/0/GAR

Robust Kalman Filtering and Its Applications.
AD-A149 044/0/GAR *515,025* PC **A03/MF A01**

AD-A149 045/7/GAR

Note on the Disturbance Decoupling Problem for Retarded Systems.
AD-A149 045/7/GAR *515,026* PC **A02/MF A01**

AD-A149 046/5/GAR

Remark on Regularization in Hilbert Spaces.
AD-A149 046/5/GAR *515,027* PC **A02/MF A01**

AD-A149 047/3/GAR

Modelling and Residual Analysis of Nonlinear Auto-Regressive Time Series in Exponential Variables.
AD-A149 047/3/GAR *515,028* PC **A03/MF A01**

AD-A149 048/1/GAR

Elimination of Sensor Artifacts from Infrared Data.
AD-A149 048/1/GAR *515,298* PC **A02/MF A01**

AD-A149 049/9/GAR

Vectorization and Implementation of an Efficient Multigrid Algorithm for the Solution of Elliptic Partial Differential Equations.
AD-A149 049/9/GAR *515,029* PC **A03/MF A01**

AD-A149 050/7/GAR

Conformal Mapping Suitable for Problems Involving Interaction Between Given Geometries and Known Far Fields.
AD-A149 050/7/GAR *515,030* PC **A03/MF A01**

AD-A149 051/5/GAR

Array Processor Utilisation in the Computation of Real-Time Images.
AD-A149 051/5/GAR *515,302* PC **A02/MF A01**

AD-A149 052/3/GAR

Free Electron Laser with a Rotating Quadrupole Wiggler.
AD-A149 052/3/GAR *515,545* PC **A03/MF A01**

AD-A149 053/1/GAR

Long Term Durability of Urea Formaldehyde Glued Joints Removed from Vampire Aircraft.
AD-A149 053/1/GAR *514,332* PC **A03/MF A01**

AD-A149 054/9/GAR

Improving the Fatigue Life of the Mirage IIIO Wing Main Spar.
AD-A149 054/9/GAR *514,333* PC **A04/MF A01**

AD-A149 055/6/GAR

Flashover Failures from Wet-Wire Arcing and Tracking.
AD-A149 055/6/GAR *514,848* PC **A02/MF A01**

AD-A149 056/4/GAR

Measurement of the Depth of a Sonar Array.
AD-A149 056/4/GAR *515,279* PC **A02/MF A01**

AD-A149 057/2/GAR

Comparison of Nomex and Evolution 3 for Use in Tent Liners.
AD-A149 057/2/GAR *514,984* PC **A02/MF A01**

AD-A149 058/0/GAR

Mechanisms of Bunyavirus Virulence: A Genetic Approach.
AD-A149 058/0/GAR *514,635* PC **A02/MF A01**

AD-A149 059/8/GAR

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AD-A149 059/8/GAR *515,199* PC **A04/MF A01**

AD-A149 060/6/GAR

Measurement of Local Heat Flux Density and Local Ion Saturation Current Density in a Plasma Jet--Translation.
AD-A149 060/6/GAR *515,570* PC **A02/MF A01**

AD-A149 062/2/GAR

Gel Drawn Fibers of Poly(Vinyl Alcohol).
AD-A149 062/2/GAR *515,010* PC **A03/MF A01**

AD-A149 063/0/GAR

Simple Model for Predicting the Flux Distribution through the Focal Plane of a Multifaceted-Concentrator Solar Furnace.
AD-A149 063/0/GAR *515,059* PC **A02/MF A01**

AD-A149 064/8/GAR

Meta-Level Control through Fault Detection and Diagnosis.
AD-A149 064/8/GAR *514,815* PC **A02/MF A01**

AD-A149 065/5/GAR

Distributing a Distributed Problem Solving Network Simulator.
AD-A149 065/5/GAR *514,816* PC **A02/MF A01**

AD-A149 066/3/GAR

Synthesis of Some Highly Silylated Aminophosphines and Their Reactions with Carbon Tetrachloride.
AD-A149 066/3/GAR *514,684* PC **A03/MF A01**

AD-A149 067/1/GAR

Defending the Frontier: A Study of the U.S. Army in the Defense of the Nebraska Frontier in the Years 1849-1853.
AD-A149 067/1/GAR *515,272* PC **A06/MF A01**

AD-A149 068/9/GAR

Perturbation of a Multiple Eigenvalue in the Benard Problem for Two Fluid Layers.
AD-A149 068/9/GAR *515,529* PC **A03/MF A01**

AD-A149 069/7/GAR

Neumann Type Boundary Conditions for Hamilton-Jacobi Equations.
AD-A149 069/7/GAR *515,031* PC **A03/MF A01**

AD-A149 070/5/GAR

Fire Support Team Vehicle (FIST-V) System: An Analysis of Human Factors, Training, Safety and Related Considerations.
AD-A149 070/5/GAR *515,504* PC **A02/MF A01**

AD-A149 071/3/GAR

Finite Element Analysis of Nonlinear Oscillations and Flutter of Shells of Revolution.
AD-A149 071/3/GAR *515,577* PC **A04/MF A01**

AD-A149 072/1/GAR

Thoughts on SOF Deployment for Deep Battle HUMINT Operations.
AD-A149 072/1/GAR *515,262* PC **A02/MF A01**

AD-A149 073/9/GAR

Resource Management: A Prioritization Process.
AD-A149 073/9/GAR *514,523* PC **A02/MF A01**

AD-A149 074/7/GAR

Fundamental Studies on MPD(Magneto Plasma Dynamics) Thrusters.
AD-A149 074/7/GAR *515,600* PC **A02/MF A01**

AD-A149 075/4/GAR

Man-Machine Interaction: Operator.
AD-A149 075/4/GAR *514,817* PC **A04/MF A01**

AD-A149 076/2/GAR

Decision Model for Selection of Microcomputers and Operating Systems.
AD-A149 076/2/GAR *514,818* PC **A05/MF A01**

AD-A149 077/0/GAR

Biomechanical Studies of Impact Acceleration Research.
AD-A149 077/0/GAR *514,665* PC **A02/MF A01**

AD-A149 078/8/GAR
Electro-Optic Spatial Light Modulator for Thermo-Elastic Generation of Programmably Focused Ultrasound.
AD-A149 078/8/GAR *515,550* PC **A02/MF A01**

AD-A149 079/6/GAR
Computable Real Analysis,
AD-A149 079/6/GAR *515,032* PC **A05/MF A01**

AD-A149 080/4/GAR
Pulsed Photothermal Radiometry for Remote Sensing of Spectroscopic and Physical Properties of Thin Film.
AD-A149 080/4/GAR *515,200* PC **A02/MF A01**

AD-A149 081/2/GAR
Objective and Social Factors as Determinants of Task Perceptions and Responses: An Integrative Framework and Empirical Investigation.
AD-A149 081/2/GAR *514,546* PC **A04/MF A01**

AD-A149 082/0/GAR
Effect of Powder Characteristics on Microstructure and Properties in Alkoxide Prepared PZT Ceramics.
AD-A149 082/0/GAR *514,958* PC **A03/MF A01**

AD-A149 083/8/GAR
Railgun Plasma Armature Characterisation Experiments,
AD-A149 083/8/GAR *514,784* PC **A03/MF A01**

AD-A149 084/6/GAR
Metal-Catalyzed Rearrangement of Alkene-Alkynes and the Stereochemistry of Metallacyclobutene Ring Opening.
AD-A149 084/6/GAR *514,690* PC **A02/MF A01**

AD-A149 085/3/GAR
Effects of Impurities and Additives on the Growth of Polycrystalline TNT,
AD-A149 085/3/GAR *514,691* PC **A02/MF A01**

AD-A149 086/1/GAR
Extracts from Symposium Countersurveillance '83 Held at Melbourne, Australia on 27 and 28 April, 1983.
AD-A149 086/1/GAR *515,299* PC **A06/MF A01**

AD-A149 087/9/GAR
Study of the Requirements of an Electronic Message Handling Facility.
AD-A149 087/9/GAR *514,819* PC **A04/MF A01**

AD-A149 088/7/GAR
Guidelines - Design to Minimize Contamination and to Facilitate Decontamination of Military Vehicles and Other Equipment: Interiors and Exteriors.
AD-A149 088/7/GAR *515,259* PC **A23/MF A01**

AD-A149 089/5/GAR
Review of the Tri-Service Academy and ROTC Scholarship Manpower Requirements as They Relate to the Decreasing High School Graduate Resource.
AD-A149 089/5/GAR *514,524* PC **A04/MF A01**

AD-A149 090/3/GAR
Credentialing of Physicians in the Army.
AD-A149 090/3/GAR *514,525* PC **A02/MF A01**

AD-A149 091/1/GAR
Equipment Profiles for Major Items of Engineer Equipment.
AD-A149 091/1/GAR *515,119* PC **A03/MF A01**

AD-A149 092/9/GAR
Regenerative Structure of Markov Chains Simulated via Common Random Numbers.
AD-A149 092/9/GAR *515,033* PC **A02/MF A01**

AD-A149 093/7/GAR
Symmetry Breaking for a Class of Semi-Linear Elliptic Problems.
AD-A149 093/7/GAR *515,034* PC **A03/MF A01**

AD-A149 094/5/GAR
Hamilton-Jacobi Equations in Infinite Dimensions. Part 1. Uniqueness of Viscosity Solutions,
AD-A149 094/5/GAR *515,035* PC **A03/MF A01**

AD-A149 095/2/GAR
Controlled Approximation and a Characterization of the Local Approximation Order.
AD-A149 095/2/GAR *515,036* PC **A02/MF A01**

AD-A149 096/0/GAR
Leadership: Structural and Functional Aspects.
AD-A149 096/0/GAR *514,547* PC **A07/MF A01**

AD-D011 436/3
Image Line Voltage Controlled Oscillator with Replaceable Components.
PAT-APPL-6-679 971/GAR *514,866* PC **A02/MF A01**

AD-D011 437/1
Coaxial Cavity Gunn Oscillator Using Probe Coupled Microstrip.
PAT-APPL-6-679 972/GAR *514,867* PC **A02/MF A01**

AD-D011 438/9
Polyactic-Polyglycolic Acid Copolymer Combined with Decalcified Freeze-Dried Bone for Use as a Bone Repair Material.
PAT-APPL-6-658 945/GAR *514,565* PC **A02/MF A01**

AD-D011 439/7
Integrated Varactor Tuned Coaxial Gunn Oscillator for 60 GHz Operation.
PAT-APPL-6-679 974/GAR *514,868* PC **A02/MF A01**

AD-D011 440/5
Filter Reflection Image Guide Oscillator and Solid State Line Scanning Device.
PAT-APPL-6-679 970/GAR *514,865* PC **A03/MF A01**

AD-D011 441/3
Improved Magnetic Bias and Delay Linearity in a Magnetostatic Wave Delay Line.
PAT-APPL-6-664 193/GAR *514,795* PC **A03/MF A01**

AD-D011 442/1
Transdigitizer for Relaying Signals from Global Positioning System (GPS) Satellites.
PAT-APPL-6-666 784/GAR *515,305* PC **A02/MF A01**

AD-D011 443/9
Variable Density Frangible Projectile.
PAT-APPL-6-666 785/GAR *515,501* PC **A02/MF A01**

AD-D011 444/7
Vibration Isolated Cold Plate Assembly.
PAT-APPL-6-666 786/GAR *515,168* PC **A02/MF A01**

AD-D011 445/4
Diffraction Diffusion Screen with Holographically-Suppressed Zero-Order Beam.
PAT-APPL-6-667 194/GAR *515,551* PC **A02/MF A01**

AD-D011 446/2
Method for Making Heterocyclic Block Copolymers.
PAT-APPL-6-610 912/GAR *514,685* PC **A02/MF A01**

AD-D011 447/0
Bistatic Coherent Radar Receiving System.
PAT-APPL-6-666 841/GAR *515,308* PC **A03/MF A01**

AD-P004 339/8/GAR
Calculation through Fault Tree Analysis of the Probability of a Warhead Being Armed Prior to Launch,
AD-P004 339/8/GAR *515,274* PC **A02/MF A01**

AD-P004 340/6/GAR
Report on AGARD Meeting Hazards Studies for Solid Propellant Rocket Motors,
AD-P004 340/6/GAR *515,695* PC **A02/MF A01**

AD-P004 341/4/GAR
NATO AC/310 Activities Report on NATO STANAG 4170 and Allied Ordnance Publication 7, AOP-7 (Manual of Tests for Qualification of Explosive Materials for Military Use),
AD-P004 341/4/GAR *515,494* PC **A02/MF A01**

AD-P004 342/2/GAR
Preventing Explosive Propagation in Racks or Containers of Tactical Missiles,
AD-P004 342/2/GAR *515,275* PC **A02/MF A01**

AD-P004 343/0/GAR
Recovery of Damaged Solid Propellants by Interrupting Burning and Crack-Propagaton Processes,
AD-P004 343/0/GAR *515,698* PC **A02/MF A01**

AD-P004 344/8/GAR
Antiplane Cracks in Solid Propellants,
AD-P004 344/8/GAR *515,699* PC **A02/MF A01**

AD-P004 345/5/GAR
Transition to Detonation from Rapid-Compression (Ramp-Waves) Generated in a Burning Porous Bed,
AD-P004 345/5/GAR *515,700* PC **A02/MF A01**

AD-P004 346/3/GAR
Thermal-Mechanical Model of Deflagration-to-Detonation in Granular Energetic Materials,
AD-P004 346/3/GAR *515,593* PC **A02/MF A01**

AD-P004 347/1/GAR
Summary of the Mechanism of Delayed Detonation,
AD-P004 347/1/GAR *515,508* PC **A02/MF A01**

AD-P004 348/9/GAR
Some Aspects of the Micromechanics of Hot Spot Formation in Energetic Materials,
AD-P004 348/9/GAR *515,495* PC **A02/MF A01**

AD-P004 349/7/GAR
Measurement of Shock Induced Reaction in Rocket Propellants by Nanosecond Infrared Radiometry and Photography,
AD-P004 349/7/GAR *515,701* PC **A02/MF A01**

AD-P004 350/5/GAR
Safety Aspects of Prepackaged Liquid Propellant Stages for Strategic Missiles,
AD-P004 350/5/GAR *515,702* PC **A02/MF A01**

AER-520
U.S. Cropland, Urbanization, and Landownership Patterns.
PB85-146637/GAR *514,361* PC **A02/MF A01**

AFAMRL-TR-84-069
Acute Toxicity of Thionyl Chloride Vapor for Rats.
AD-A148 952/5/GAR *514,669* PC **A02/MF A01**

AFGL-TR-84-0259
Solar Radio Bursts, Proton Events and Geomagnetic Activity,
AD-A149 018/4/GAR *514,385* PC **A03/MF A01**

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Air Force Civilian Potential Appraisal System: Development.
AD-A148 909/5/GAR *514,515* PC **A09/MF A01**

AFIT/CI/NR-84-78T
Impact of the AT and T (American Telephone and Telegraph) Divestiture on the Strategic Air Command.
AD-A148 957/4/GAR *515,281* PC **A04/MF A01**

AFIT/CI/NR-84-91D
Effects of Tempo and Intensity on Hyperactive Children.
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AFOSR-TR-84-1113
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AFOSR-TR-84-1120
Mistranslation of the mRNA Encoding Bacteriophage T7 0.3 Protein.
AD-A148 875/8/GAR *514,632* PC **A02/MF A01**

AFOSR-TR-84-1122
Anticholinesterase Effects on Number and Function of Brain Muscarinic Receptors and Central Cholinergic Activity: Drug Intervention.
AD-A148 973/1/GAR *514,640* PC **A03/MF A01**

AFOSR-TR-84-1125
Multiple Resources and Brain Laterality.
AD-A148 912/9/GAR *514,645* PC **A02/MF A01**

AFOSR-TR-84-1126
Finite Element Analysis of Nonlinear Oscillations and Flutter of Shells of Revolution.
AD-A149 071/3/GAR *515,577* PC **A04/MF A01**

AFOSR-TR-84-1127
Comprehensive Study on Subliminate Crack Growth Stability and Its Effects on the Load-Carrying Capacity.
AD-A149 037/4/GAR *514,971* PC **A09/MF A01**

AFOSR-TR-84-1136
Thermospheric Energy Flux of the Semidiurnal Tide.
AD-A149 029/1/GAR *514,404* PC **A02/MF A01**

AFOSR-TR-84-1144
Axial Velocity Spread Acceptance of Free Electron Lasers.
AD-A149 024/2/GAR *515,544* PC **A03/MF A01**

AFOSR-TR-84-1147
New Methods for Numerical Solution of One Class of Strongly Nonlinear Partial Differential Equations with Applications in Hydrodynamics.
AD-A149 026/7/GAR *515,023* PC **A02/MF A01**

AFOSR-TR-84-1148
Research in Adaptive and Decentralized Control.
AD-A148 964/0/GAR *515,020* PC **A02/MF A01**

AFOSR-TR-84-1151
More Limit Theory for the Sample Correlation Function of Moving Averages.
AD-A148 975/6/GAR *515,021* PC **A03/MF A01**

AFOSR-TR-84-1155
Orientation of Hydroquinone and Benzoquinone Adsorbed on Platinum Electrodes: Studies by Reflection-Adsorption Infrared Spectroscopy.
AD-A149 011/9/GAR *514,688* PC **A02/MF A01**

AFOSR-TR-84-1194
Fundamental Studies on MPD(Magneto Plasma Dynamics) Thrusters.
AD-A149 074/7/GAR *515,600* PC **A02/MF A01**

AFWAL-TR-84-3009
Aerodynamic Improvements by Discrete Wing Tip Jets.
AD-A148 981/4/GAR *514,314* PC **A06/MF A01**

AGARD-CP-368
Conference Proceedings of Engine Cyclic Durability by Analysis and Testing.
AD-A149 028/3/GAR *515,680* PC **A13/MF A01**

AGARD-CP-375
Conference Proceedings of Operational Loads Data Held at Sienna, Italy on 2-6 April 1984,
AD-A149 025/9/GAR *514,329* PC **A14/MF A01**

AGARD-LS-137
Process Modeling Applied to Metal Forming and Thermomechanical Processing,
AD-A149 027/5/GAR *515,146* PC **A08/MF A01**

AGRICULTURE HANDBOOK-607
Tropical Timbers of the World,
PB85-156917/GAR *514,381* PC **A20/MF A01**

AI-M-770
Selecting One Among the Many: A Simple Network Implementing Shifts in Selective Visual Attention.
AD-A148 989/7/GAR *514,545* PC **A02/MF A01**

AI-M-806
Collision Detection for Moving Polyhedra.
AD-A148 961/6/GAR *515,049* PC **A02/MF A01**

AI-M-809
Simplified Grasping and Manipulation with Dextrous Robot Hands.
AD-A148 962/4/GAR *515,163* PC **A02/MF A01**

AI-TR-789
Qualitative Process Theory.
AD-A148 987/1/GAR *514,810* PC **A09/MF A01**

AIB-483
Federal Credit Programs for Agriculture: Background for 1985 Farm Legislation.

PB85-138923/GAR *514,348* PC A03/MF A01

AID EVALUATION SS-9

Private Sector: Costa Rica.
PB85-141679/GAR *514,479* PC A07/MF A01

AID EVALUATION SS-10

Private Sector: The Tortoise Walk. Public Policy and Private Activity in the Economic Development of Cameroon.
PB85-140048/GAR *514,480* PC A08/MF A01

AID EVALUATION SS-11

Private Sector and the Economic Development of Malawi.
PB85-140606/GAR *514,473* PC A07/MF A01

AID EVALUATION SS-12

Ventures in the Informal Sector, and How They Worked Out in Brazil.
PB85-140598/GAR *514,472* PC A09/MF A01

AID EVALUATION SS-13

Evaluation of Small Enterprise Programs and Projects: Issues in Business and Community Development.
PB85-140168/GAR *514,471* PC A05/MF A01

AID EVALUATION SS-14

Private Sector: Regulation of Rural Markets in Africa.
PB85-140150/GAR *514,349* PC A04/MF A01

AID EVALUATION SS-15

Private Sector: Ethnicity, Individual Initiative, and Economic Growth in an African Plural Society. The Bamileke of Cameroon.
PB85-140192/GAR *514,552* PC A04/MF A01

AID EVALUATION SS-16

Private Sector Evaluation: The Dominican Republic.
PB85-140135/GAR *514,470* PC A08/MF A01

AID-PN-AAJ-177

Economic Development of Korea: Sui Generis or Generic.
PB85-136760/GAR *514,465* PC A04/MF A01

AID-PN-AAJ-618

Private Sector: Ideas and Opportunities. A Review of Basic Concepts and Selected Experience.
PB85-136331/GAR *514,464* PC A07/MF A01

AID-PN-AAK-844

Ethanol from Sugar Crops: A Critical Review.
PB85-140176/GAR *515,671* PC A06/MF A01

AID-PN-AAL-003

Food Aid and Development: The Impact and Effectiveness of Bilateral PL 480 Title 1-Type Assistance.
PB85-140572/GAR *514,553* PC A05/MF A01

AID-PN-AAL-004

Private Sector: The Tortoise Walk. Public Policy and Private Activity in the Economic Development of Cameroon.
PB85-140048/GAR *514,480* PC A08/MF A01

AID-PN-AAL-005

Private Sector: Costa Rica.
PB85-141679/GAR *514,479* PC A07/MF A01

AID-PN-AAL-006

Private Sector and the Economic Development of Malawi.
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AID-PN-AAL-007

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AID-PN-AAL-692

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AID-PN-AAL-770

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AID-PN-AAM-091

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AID-PN-AAM-180

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AID-PN-AAM-183

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AID-PN-AAM-184

Mauritania: Rural Assessment and Manpower Surveys. Inland Fisheries.
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AID-PN-AAM-185

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AID-PN-AAM-194

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AID-PN-AAM-207

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PB85-142644/GAR *514,351* PC A11/MF A01

AID-PN-AAM-643
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PB85-142669/GAR *514,781* PC A03/MF A01

AID-PN-AAM-876
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PB85-146058/GAR *514,369* PC A05/MF A01

AID-PN-AAM-891
Water and Human Health,
PB85-144723/GAR *515,110* PC A07/MF A01

AID-PN-AAN-103
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PB85-147791/GAR *514,491* PC A05/MF A01

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PB85-136331/GAR *514,464* PC A07/MF A01

AID PROGRAM EVALUATION DP-15
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Array Processor Utilisation in the Computation of Real-Time Images.
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DE84752107/GAR *514,757* PC A04/MF A01

BMFT-FB-T-84-126
Development of Components for Micro-C Oriented Sensor Systems.
N85-13215/7/GAR *515,224* PC A09/MF A01

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Magnetic Inductive Flowmeter for Low Conducting Liquids.
N85-13216/5/GAR *515,225* PC A04/MF A01

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Development and Testing of Thin Film Cells for High Temperature Water Vapor Electrolysis.
N85-13001/1/GAR *514,702* PC A05/MF A01

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Ion Contrasting Chamber for Discrimination of Grains and Textures.
N85-13036/7/GAR *514,993* PC A03/MF A01

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N85-13217/3/GAR *515,226* PC A03/MF A01

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N85-13061/5/GAR *514,919* PC A06/MF A01

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N85-13219/9/GAR *515,151* PC A05/MF A01

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Investigation and Development of Multicolored Liquid Crystal Display Systems for Automotive Dashboard Application and Large Format Information Boards.
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BNL-51801
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BNL-51803
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BRS2480
Implementing Waveguide Bandwidth Six-Port Reflectometer Circuits at Millimetric Wavelengths.
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BRL-CR-536
Projectile Motion in a Flexible Gun Tube.
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Mesure des Precharges de Serrage dans les Assemblages Boulonnes Par Methode Ultrasonore (Measurement of the Preloading of Bolted Joints by the Ultrasonic Method).
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N85-13282/7/GAR *515,228* PC A02/MF A01

CETIM-11-E-350
Deformations Non-Lineaires et Flambage Statique Lineaire de Structures Soumises a des Forces de Pression (Nonlinear Deformation and Static Linear Buckling of Structures under Pressure).
N85-13281/9/GAR *515,581* PC A03/MF A01

CETIM-11-H-337
Bruit Robinet/Fluctuations de Pression. Etude du Comportement Acoustique des Equipments Hydrauliques du Batiment en Fonction de la Temperature (Tap Noise-Pressure Fluctuations. Study of the Acoustic Behavior of Hydraulic Equipment in Buildings as a Function of the Temperature).
N85-13201/7/GAR *515,179* PC A08/MF A01

CETIM-11-H-445
Bruit des Petits Groupes Moto-Compresseurs Mobiles. Experimentation de Plusieurs Traitements Acoustiques de Cout Limite et Permettant des Gains Progressifs (Noise in Small Portable Motocompressors. Experiments on Limited-Cost Acoustic Treatments to Obtain Progressive Improvements).
N85-13557/2/GAR *515,694* PC A04/MF A01

CETIM-15-J-041
Surveillance des Machines (The Monitoring of Machines).
N85-13253/8/GAR *515,167* PC A03/MF A01

CETIM-100390
Corrosions des Laitons de Robinetterie (Corrosion of Brass in Potable Water Service).
N85-13037/5/GAR *514,994* PC A02/MF A01

CETIM-101010
Formulations et Methodes de Resolution des Problemes Classiques du Flambage Statique (Formulation and Solution Methods for Classical Problems of Static Buckling).
N85-13260/1/GAR *515,580* PC A04/MF A01

CFD/83/9
Numerical Calculation of Steady Turbulent Flows in Adverse Pressure Gradients.
N85-13195/1/GAR *515,534* PC A03/MF A01

CFD/84/7-PT-1
Progress in the Development of a Two-Fluid Model of Turbulence for Near-Wall Flows, Part 1.
N85-13196/9/GAR *515,535* PC A03/MF A01

CFD/84/9-PT-3
Progress in the Development of a Two-Fluid Model of Turbulence for Near-Wall Flows. Part 3: Preliminary Investigation of a Stably-Stratified Boundary Layer.
N85-13197/7/GAR *515,536* PC A02/MF A01

CFD/84/12
Proposal for Wall Function for Friction and Heat Transfer in the Presence of Roughness and Mass Transfer.
N85-13198/5/GAR *515,537* PC A02/MF A01

CFD/84/13
Combustion Waves in Dispersed-2-Phase Mixtures.
N85-13003/7/GAR *514,704* PC A02/MF A01

CHAM-4045/1
Analysis of Physical-Chemical Processes Governing SSME Internal Fluid Flows.
N85-12859/3/GAR *515,696* PC A02/MF A01

CIAT/SER-09SR-3
Mejoramiento de Arroz (Rice Improvement).
PB85-143113/GAR *514,376* PC A07/MF A01

CISE-2341
Qualificazione di Sistemi Non-Invasivi Per la Rivelazione on-Line di Perdite in Preriscaldatori d'Acqua Alimento AD Alta Pressione (Qualification of Noninvasive Systems for on-Line Leak Detection in High Pressure Feed Water Preheaters).
N85-13555/6/GAR *515,230* PC A03/MF A01

CNES-CT/PMF/APS/EMS-177
Mars Dust Sample Return Mission.
N85-12915/3/GAR *515,704* PC A03/MF A01

CNES-NT-105
Simulation d'Une Chaine de Transmission a Elements Faillement Non Lineaires. Calculs des Produits d'Intermodulation sur UN Signal Compose de N Porteuses (Simulation of a Transmission Circuit Composed of Slightly Nonlinear Elements. Computation of the Intermodulation on Signals Composed of N Carriers).
N85-13167/0/GAR *514,859* PC A04/MF A01

CNES-NT-106
L'Organisation de la Qualite (Quality Organization).
N85-13257/9/GAR *515,253* PC A07/MF A01

CNES-NT-107
Conception de Circuits Assistee Par Ordinateur: Realisation de Masques pour l'Elaboration de Circuits Microondes (Computerized Circuit Designs: Realization of Masks to Manufacture Microwave Circuits).
N85-13168/8/GAR *515,150* PC A05/MF A01

CNES-NT-108
Fiabilite Composants et Technologies d'Assemblage (Component Reliability and Assembling Technologies).
N85-13258/7/GAR *515,153* PC A04/MF A01

CNES-NT-109
Les Composants Electronics pour Applications Spatiales (Electronic Components for Space Applications).
N85-13169/6/GAR *514,849* PC A05/MF A01

CNES-NT-110
L'Analyse de la Valeur (Value Analysis).
N85-13684/4/GAR *514,463* PC A06/MF A01

CNES-NT-111
Les Systemes de Lancements (Launching Systems).
N85-12917/9/GAR *515,721* PC A04/MF A01

CNES-84/QPE/FT/190
Les Transistors MOS de Puissance (Metal Oxide Semiconductors Power Transistors).
N85-13166/2/GAR *514,792* PC A02/MF A01

CONF-801225-5-DR
Iodine Sorption/Desorption from Low-Alloy Steel and Graphite. Draft.
DE85000966/GAR *515,477* PC A03/MF A01

CONF-821285-
Use of Energy in Agricultural Households.
DE84770478/GAR *514,885* PC A05/MF A01

CONF-830763-17
Detonation E.O.S. Patterns for Several Explosives.
DE85001039/GAR *515,499* PC A02/MF A01

CONF-831203-189
Design Description of the Vacuum Vessel for the Advanced Toroidal Facility.
DE85002561/GAR *515,332* PC A02/MF A01

CONF-831265-7
Review of AVLIS Technology for Production-Scale LIS Systems and Construction.
DE85002002/GAR *515,338* PC A03/MF A01

CONF-840178-1
Mini-Modal Testing of Wind Turbines Using Novel Excitation.
DE85000666/GAR *514,902* PC A02/MF A01

CONF-840202-28
Interactive and Automated Systems for Nuclear Track Measurements with Applications to Fast Neutron Dosimetry.
DE85002240/GAR *515,353* PC A02/MF A01

CONF-840245-15
Hydrologic Considerations for Rock RIPRAP Protection of Uranium Tailings Impoundments.
DE85000826/GAR *515,395* PC A02/MF A01

CONF-840383-6
CP DDT Detonators. II. Output Characterization.
DE84017251/GAR *515,497* PC A02/MF A01

CONF-840389-7
Artificial Photosynthesis with Algal and Reconstituted Systems.
DE85002557/GAR *515,660* PC A02/MF A01

CONF-840422-1
Energy-Related Risk in the United States in the Year 2020.
DE84017213/GAR *514,881* PC A03/MF A01

CONF-840520-25
First-Wall and Limiter Conditioning in TFTR.
DE85002714/GAR *515,336* PC A02/MF A01

CONF-840627-12
Neutron and gamma-Ray Dose Measurements at Various Distances from the Little Boy Replica.
DE85002172/GAR *515,267* PC A02/MF A01

CONF-840694-9
Development and Evaluation of Supercritical Fluid Chromatography/Mass Spectrometry for Polar and High Molecular Weight Coal Components.
DE85000827/GAR *515,623* PC A02/MF A01

CONF-840721-3
Subsidence in the Craters of Nuclear Tests at the Pacific Proving Grounds.
DE85000747/GAR *515,344* PC A03/MF A01

CONF-840722-2
FFTF Fuel Assembly Outlet Temperature Measurements and Comparison to Predictions.
DE85001215/GAR *515,440* PC A02/MF A01

CONF-840738-6
Nondestructive Method for Detecting Machine Damage in Beryllium.
DE85001074/GAR *515,203* PC A02/MF A01

CONF-840760-15
Ion Beam Mixing: Basic Experiments.
DE85002763/GAR *515,560* PC A03/MF A01

CONF-840767-9
Comparison of XEDS and EELS Using Conventional Beryllium Window and Windowless Detectors.
DE85002734/GAR *515,212* PC A02/MF A01

CONF-840767-10
Calculation of Si(Li) X-Ray Detector Efficiencies.
DE85002732/GAR *515,211* PC A02/MF A01

CONF-840783-3
X-Ray Holography of Biological Specimens.
DE85002437/GAR *514,656* PC A02/MF A01

CONF-840797-1
Hydrogen from Solar Energy.
DE85001914/GAR *515,633* PC A02/MF A01

CONF-840805-24
Studies of the Kinetics and Mechanisms of Ammonia Synthesis and Hydrodesulfurization on Metal Single Crystal Surfaces.
DE85001650/GAR *514,697* PC A02/MF A01

CONF-840806-12
Prototype Firing Range Air Cleaning System.
DE85000360/GAR *515,176* PC A03/MF A01

CONF-840806-13
Krypton-85 Health Risk Assessment for a Nuclear Fuel Reprocessing Plant.
DE85000838/GAR *514,615* PC A02/MF A01

CONF-840809-21
Special Function Instruments for Binary Cycle Geothermal Power Plants.
DE85003109/GAR *514,915* PC A02/MF A01

CONF-840814-1
Assessing the Performance of Geologic Repositories for Nuclear Waste.
DE85001197/GAR *515,399* PC A02/MF A01

CONF-840816-21
Debris Dispersal in Reactor Material Experiments on Corium-Water Thermal Interactions in Ex-Vessel Geometry.
DE85000077/GAR *515,376* PC A02/MF A01

CONF-840821-5
Optical Second Harmonic Generation for Surface Studies.
DE85000670/GAR *515,519* PC A02/MF A01

CONF-840859-2
Evaluation of Chemical Stabilizers and Windscreens for Wind Erosion Control of Uranium Mill Tailings.
DE85000828/GAR *515,396* PC A02/MF A01

CONF-840896-1
DOE Hazard Classification for Insensitive High Explosives (IHE).
DE84017002/GAR *515,496* PC A02/MF A01

CONF-840901-13
Flux Synthesis for the on-Line Surveillance of Nuclear Power Plants.
DE85000928/GAR *515,485* PC A02/MF A01

CONF-840901-19
Finite Element Method for Solving Neutron Transport Problems.
DE85001075/GAR *515,379* PC A02/MF A01

CONF-840902-7
Data Acquisition and Control System for the K/sub 1C/-HSST Experiments at the ORR.
DE85001135/GAR *515,438* PC **A02/MF A01**

CONF-840902-16
Standardized Physics-Dosimetry for US Pressure Vessel Cavity Surveillance Programs.
DE85002236/GAR *515,444* PC **A02/MF A01**

CONF-840910-12
Toroidal Fusion Core Experiment (TFCX) Studies.
DE84016813/GAR *515,309* PC **A02/MF A01**

CONF-840915-6
Startup of Large Coil Test Facility.
DE85001669/GAR *514,789* PC **A02/MF A01**

CONF-840915-7
Comparison of Three ICF Reactor Designs.
DE85001211/GAR *515,320* PC **A02/MF A01**

CONF-840916-3-DR
Remote Handling Requirements and Considerations for D-T Fusion Reactors.
DE85000940/GAR *515,317* PC **A02/MF A01**

CONF-840922-18
Approaches to Ultrafast Neutron Detectors.
DE85001206/GAR *515,347* PC **A02/MF A01**

CONF-840995-3
Characteristics of Quality Data.
DE85001203/GAR *514,444* PC **A02/MF A01**

CONF-841003-ABSTS.
Personnel Radiation Dosimetry Symposium: Program and Abstracts.
DE85002198/GAR *515,382* PC **A05/MF A01**

CONF-841005-1
GSI-LBL Plastic Ball/Wall Spectrometer.
DE85001651/GAR *515,351* PC **A03/MF A01**

CONF-841005-2
Large Acceptance Spectrometers for pi exp 0 Mesons.
DE85002472/GAR *515,357* PC **A02/MF A01**

CONF-841007-7
Impact of Instrument Response Variations on Health Physics Measurements.
DE85000860/GAR *514,583* PC **A02/MF A01**

CONF-841007-8
Use of a Commercial Ranging System in Field Surveys of Radioactively Contaminated Sites.
DE85002384/GAR *515,354* PC **A02/MF A01**

CONF-841007-13
Monte Carlo Simulation of the Sequential Probability Ratio Test for Radiation Monitoring.
DE85002409/GAR *515,355* PC **A02/MF A01**

CONF-841007-14
Nondestructive Assay System Development for a Plutonium Scrap Recovery Facility.
DE85002421/GAR *515,412* PC **A02/MF A01**

CONF-841007-16
Integration of NDA Instruments into the Savannah River Plant Computer Network.
DE85002416/GAR *515,356* PC **A02/MF A01**

CONF-841007-20
Compensation Effects in Hadron Calorimeters.
DE85002594/GAR *515,358* PC **A02/MF A01**

CONF-841007-22
Automated Servo Controlled Calorimetry.
DE85002527/GAR *515,206* PC **A02/MF A01**

CONF-841007-23
Versatile CAMAC Power Supply Controller-Monitor with Built-in Ramping and Ripple Monitor.
DE85002686/GAR *515,210* PC **A02**

CONF-841007-24
Technique for Reduction of Coherence Function Bias Error.
DE85002593/GAR *515,208* PC **A02**

CONF-841014-1
In Situ gamma-Ray Spectrometric Analysis of Radionuclide Distributions at a Commercial Shallow Land Burial Site.
DE85002376/GAR *515,411* PC **A02/MF A01**

CONF-841017-6
Report of the First United States Conference on Utility Experience with Neutron Noise Analysis.
DE85002459/GAR *515,447* PC **A02/MF A01**

CONF-841017-7
Long-Term Automated Surveillance of a Commercial Nuclear Power Plant.
DE85002469/GAR *515,449* PC **A02/MF A01**

CONF-841017-8
In-Core Coolant Flow Monitoring of Pressurized Water Reactors Using Temperature and Neutron Noise.
DE85002468/GAR *515,448* PC **A02/MF A01**

CONF-841099-5
Classroom Training Revision Methodology.
DE85002477/GAR *514,528* PC **A02/MF A01**

CONF-841099-6
Maintenance Personnel Performance Simulation (MAPPS) Model.
DE85002324/GAR *515,361* PC **A02/MF A01**

CONF-841099-7
Nuclear Power Plant Control Room Operators' Performance Research.
DE85002326/GAR *515,362* PC **A02/MF A01**

CONF-841105-1
Market Study of International Needs for New Electric Generating Capacity.
DE84014042/GAR *514,878* PC **A02/MF A01**

CONF-841105-3
Comparison of L04, L05, and L07: Three Irradiated 7-Pin Bundle TUCOP Tests.
DE84014680/GAR *515,471* PC **A02/MF A01**

CONF-841105-16
Fuel and Control Rod Failure Behavior During Degraded Core Accidents.
DE84014535/GAR *515,430* PC **A02/MF A01**

CONF-841105-17
Methodology for Validation of Safety Parameters and Fault Identification.
DE84014685/GAR *515,431* PC **A02/MF A01**

CONF-841105-19
PFR/TREAT Program: Objectives, Accomplishments, and Plans.
DE84014751/GAR *515,472* PC **A02/MF A01**

CONF-841105-23-ABST.
Steady-State and Transient Fission Gas Release and Swelling Model for LIFE-4.
DE84014730/GAR *515,421* PC **A02/MF A01**

CONF-841105-24
Analytical Formula for Fuel Particle to Liquid Sodium Heat Transfer.
DE84014734/GAR *515,432* PC **A02/MF A01**

CONF-841105-32
Integral Fast Reactor Concept.
DE84015828/GAR *515,433* PC **A02/MF A01**

CONF-841117-7
High Power Pulsed Accelerators with Potential Industrial Applications.
DE85001710/GAR *515,553* PC **A02/MF A01**

CONF-841117-15
Low-Energy Nuclear Reactions with Hydrogen Isotopes.
DE85002388/GAR *515,564* PC **A02/MF A01**

CONF-841121-7
Molten Salt Reactor for Dispersed Solid Phase Chlorination.
DE85002611/GAR *514,678* PC **A02/MF A01**

CONF-841121-9
Hydrodesulfurization by Reduced Molybdenum Sulfides: Activity and Selectivity of Chevrel Phase Catalysts.
DE85002613/GAR *514,698* PC **A02/MF A01**

CONF-841129-1
Utility-Interactive Photovoltaic Power Conditioning Technology in the United States.
DE85002634/GAR *514,941* PC **A02/MF A01**

CONF-841157-9
Diffusion of Plutonium in Compacted, Brine-Saturated Bentonite.
DE85002440/GAR *515,413* PC **A02/MF A01**

CONF-841157-11
Transport and Capture of Colloidal Particles in Single Fractures.
DE85000413/GAR *515,390* PC **A02/MF A01**

CONF-841174-2
Coolability of UO sub 2 with Downward Heat Removal: The D10 Experiment.
DE84017007/GAR *515,374* PC **A02/MF A01**

CONF-841174-3
Modeling of Core Debris-Sodium-Concrete Interactions.
DE85000076/GAR *515,375* PC **A02/MF A01**

CONF-841174-5
Bubble-Induced Mixing of Two Horizontal Liquid Layers with Non-Uniform Gas Injection at the Bottom.
DE85000097/GAR *515,377* PC **A02/MF A01**

CONF-841174-6
Coolability of UO2 Debris Beds in Pressurized Water Pools: DCC-1 and DCC-2 Experiment Results.
DE84017005/GAR *515,373* PC **A02**

CONF-841186-1
Contingency Analysis for Construction Estimate.
DE84016252/GAR *515,195* PC **A02/MF A01**

CONF-841187-1
Guide to Radiological Accident Considerations for Siting and Design of DOE Nonreactor Nuclear Facilities.
DE85002435/GAR *515,446* PC **A02/MF A01**

CONF-841195-1
Thermal-Hydraulic Uncertainties Affecting Severe Accident Progression.
DE84017381/GAR *515,434* PC **A02/MF A01**

CONF-841201-3
Leakage-Flow-Induced Vibration of a Tube-in-Tube Slip Joint.
DE84007301/GAR *515,427* PC **A02/MF A01**

CONF-841201-6
Unprotected Loss-of-Heat Sink Simulation in the EBR-II Plant.
DE84009630/GAR *515,428* PC **A02/MF A01**

CONF-841201-7
Three-Dimensional Analysis of Heat Transfer and Gas Flow in a Radiant Furnace.
DE84011732/GAR *515,060* PC **A03/MF A01**

CONF-841201-12
Theoretical Analysis of Condensation in the Presence of Noncondensable Gases as Applied to Open Cycle OTEC Condensers.
DE84015809/GAR *514,879* PC **A02/MF A01**

CONF-841201-16
Measurement of Fenestration Net Energy Performance: Considerations Leading to Development of the Mobile Window Thermal Test (MoWITT) Facility.
DE85000711/GAR *515,120* PC **A02/MF A01**

CONF-841210-2
Actinide Separations by Supported Liquid Membranes.
DE84013462/GAR *515,386* PC **A02/MF A01**

CONF-841243-1-REV.1
Post-Processing of Bibliographic Citations from DOE/RECON, NASA/RECON, and DOD/DROLS. Revision 1.
DE85000617/GAR *514,443* PC **A02/MF A01**

CONF-8004243-
Fuel Savings by Advanced Vehicle Drive Systems.
DE84770472/GAR *515,126* PC **A08/MF A01**

CONF-8010366-
Energy Raw Materials in the Alps-Adria Region.
DE84770506/GAR *514,889* PC **A08/MF A01**

CONF-8310218-2
Investigation of Factors Influencing Infrared Roof Moisture Surveys Using a Mathematical Model.
DE85002300/GAR *515,121* PC **A02/MF A01**

CONF-8310338-1
3D Field Calculation of the GEM Prototype Magnet and Comparison with Measurements.
DE85003040/GAR *515,561* PC **A03**

CONF-8311200-1
Sulfur Activation in Electric Pole Insulators in Hiroshima.
DE85001169/GAR *515,266* PC **A02/MF A01**

CONF-8403137-
Workshop on Detectors for Relativistic Nuclear Collisions: Proceedings.
DE85001402/GAR *515,348* PC **A08/MF A01**

CONF-8403148-2
Materials Science with Synchrotron Radiation: The Case for a Superprobe.
DE85001893/GAR *515,204* PC **A03/MF A01**

CONF-8404135-7
Infrared-Thermal Wave Scanner for NDE of Naval Thermal Spray Coatings.
DE85002237/GAR *515,205* PC **A03/MF A01**

CONF-8404196-3-EXC.
Excerpts from Remarks by US Energy Secretary Donald Paul Hodel Before the National Independent Coal Operators Association.
DE85000205/GAR *515,615* PC **A02/MF A01**

CONF-8404197-1
Electron Image Simulation: A Complementary Processing Technique.
DE85000685/GAR *515,520* PC **A03/MF A01**

CONF-8405153-4
Observed Acoustic and Aeroelastic Spectral Responses of a MOD-2 Turbine Blade to Turbulence Excitation.
DE84013012/GAR *514,876* PC **A02**

CONF-8406198-17
4 pi Detectors.
DE85002605/GAR *515,359* PC **A02/MF A01**

CONF-8408112-1
Achieving Aggressive Mitigation Through State Regulation: A Case of the Wyoming Industrial Development Information and Siting Act.
DE85000067/GAR *514,894* PC **A02/MF A01**

CONF-8408113-1
Use of the ORACLE DBMS in Determining the Response of Complex Scientific Instrumentation.
DE85001742/GAR *515,328* PC **A02/MF A01**

CONF-8408115-1
High Resolution Computed Tomography for Solid Modeling and Computer Aided Design.
DE85000085/GAR *515,147* PC **A02/MF A01**

CONF-8409115-9
Engineered Sorbent Barriers for Low-Level Waste.
DE85000833/GAR *515,397* PC **A02/MF A01**

CONF-8409115-10
Transport Assessment - Arid: Measurement and Prediction of Water Movement Below the Root Zone.
DE85000834/GAR *515,398* PC **A02/MF A01**

CONF-8409115-11
Organic Complexant-Enhanced Mobility of Toxic Elements in Low-Level Wastes.
DE85002375/GAR *515,410* PC **A02/MF A01**

CONF-8409126-1
Contingency Analysis for Construction Estimate.
DE84016252/GAR *515,195* PC **A02/MF A01**

CONF-8409133-1
Pilot Program for an Automated Data Collection System.
DE84016809/GAR *515,473* PC **A02**

CONF-8409143-8
Time-of-Flight Isochronous (TOFI) Spectrometer for Direct Mass Measurements of Exotic Light Nuclei.
DE85002050/GAR *515,352* PC **A02/MF A01**

NTIS ORDER/REPORT NUMBER INDEX

CONF-8409153-2
Pulp and Paper Industry Energy Impacts Through Implementation of Biotechnologies.
DE85002377/GAR *515,019* PC A02/MF A01

CONF-8409161-1
Portable Microdosimetry System.
DE85000841/GAR *514,655* PC A02/MF A01

CONF-8409165-1
Influence of Individual Reflections on the Precision of Parameter Estimates in Least Squares Refinement.
DE85000830/GAR *515,521* PC A03/MF A01

CONF-8409170-1
Application of Wald's Sequential Probability Ratio Test to Nuclear Materials Control.
DE85002017/GAR *515,479* PC A02/MF A01

CONF-8409171-1
Proposal for Hollow Cathode Electron Gun for Electron Cooling.
DE85002721/GAR *515,559* PC A02/MF A01

CONF-8409173-1
Joint JET ISX-B Beryllium Limiter Experiment. Monthly Newsletter, June 1984.
DE85002487/GAR *515,331* PC A03/MF A01

CONF-8410102-1
Freight Network Equilibrium Model Revisited: The Freight Network Modeling System.
DE85002233/GAR *515,127* PC A02/MF A01

CONF-8410112-2
Linear, Position-Sensitive X-Ray Detector Used for Real-Time Calculations of Small-Angle Scattering Parameters with Submillisecond Resolution.
DE85002530/GAR *515,207* PC A02/MF A01

CONF-8410143-13
MARCON - Development and Applications to Containment Loading Calculations.
DE85002442/GAR *515,384* PC A02/MF A01

CONF-8410143-14
Applications of the CONTAIN 1.0 Computer Code to the Analysis of Containment Loading under Severe Accident Conditions.
DE85002430/GAR *515,383* PC A02/MF A01

CONF-8410143-17
Hydrogen Flame Acceleration and Transition to Detonation.
DE85000611/GAR *515,378* PC A02/MF A01

CONF-8410143-18
Los Alamos Nuclear Plant Analyzer: An Interactive Power-Plant Simulation Program.
DE85002412/GAR *515,445* PC A02/MF A01

CONF-8410143-21
Interfacing Systems Loss-of-Coolant Accident in Oconee-1 Pressurized Water Reactor.
DE85000175/GAR *515,436* PC A02/MF A01

CONF-8410143-27
Development of Methods for Nuclear Power Plant Personnel Qualifications and Training.
DE85002559/GAR *514,529* PC A02/MF A01

CONF-8410153-2
Assessment of Ground-Coil Heat-Pump Technology.
DE85002567/GAR *515,071* PC A02/MF A01

CONF-8410153-3
Predicted Energy Savings for a Residential Heat Pump Utilizing a Fluidized-Bed Heat Exchanger.
DE85002467/GAR *515,070* PC A02/MF A01

CONF-8410156-1
Molecular Dynamics Study of the Reaction: H Sub 2 + OH Yields H sub 2 O + H.
DE85000624/GAR *514,694* PC A03/MF A01

CONF-8410158-1
Design and Use of Nonstandard Tensile Specimens for Irradiated Materials Testing.
DE85001071/GAR *514,987* PC A03/MF A01

CONF-8410160-1
Resonantly Enhanced Multiphoton Ionization of Molecules.
DE85000585/GAR *514,693* PC A02/MF A01

CONF-8410166-2
Recent Development in Pyrochemistry at Los Alamos.
DE85000174/GAR *515,388* PC A02/MF A01

CONF-8410170-1
MCNP Code.
DE85002565/GAR *515,486* PC A03/MF A01

CONF-8410172-2
Status Report on the ORNL (Oak Ridge National Laboratory) 25 URC Accelerator.
DE85002498/GAR *515,554* PC A02/MF A01

CONF-8410175-1
Varian Gyrotron Development Program.
DE85002568/GAR *515,333* PC A02/MF A01

CONF-8410179-1
Geothermal Pumping Systems.
DE85002246/GAR *514,907* PC A02/MF A01

CONF-8410183-1
Thermal Effects in Radiation Processing.
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Adaptation of an Air-Dielectric RF Cable for Use as an Oil-Filled High Voltage Pulse Transmission Line.
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Pipe-to-Pipe Impact Program.
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Underground Pumped Hydroelectric Storage.
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Quality of Scientific and Engineering Data.
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NTIS ORDER/REPORT NUMBER INDEX

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Transport and Capture of Colloidal Particles in Single Fractures.
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DE85002281/GAR *515,643* PC A02/MF A01

DE85002282/GAR
Energy Data Report: Natural Gas Monthly Report, March 1982.
DE85002282/GAR *515,644* PC A02/MF A01

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Energy Data Report: Natural Gas Monthly Report, April 1982.
DE85002283/GAR *515,645* PC A02/MF A01

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Energy Data Report: Natural Gas Monthly Report, May 1982.
DE85002284/GAR *515,646* PC A02/MF A01

DE85002290/GAR
Cost and Quality of Fuels for Electric Utility Plants, November 1981.
DE85002290/GAR *515,647* PC A04/MF A01

DE85002294/GAR
Energy Data Report: Prices and Margins of No. 2 Distillate Fuel Oil. Monthly Report, December 1981.
DE85002294/GAR *515,648* PC A02/MF A01

DE85002300/GAR
Investigation of Factors Influencing Infrared Roof Moisture Surveys Using a Mathematical Model.
DE85002300/GAR *515,121* PC A02/MF A01

DE85002302/GAR
Comments on a Letter by George D. DeBuchananne (US Geological Survey) Regarding the Use of Salt Domes for High-Level Waste Disposal.
DE85002302/GAR *515,404* PC A05/MF A01

DE85002322/GAR
York Canyon Mine Evaluation. Monthly Technical Progress Report No. 39, October 1-31, 1984.
DE85002322/GAR *514,765* PC A02/MF A01

DE85002324/GAR
Maintenance Personnel Performance Simulation (MAPPS) Model.
DE85002324/GAR *515,361* PC A02/MF A01

DE85002326/GAR
Nuclear Power Plant Control Room Operators' Performance Research.
DE85002326/GAR *515,362* PC A02/MF A01

DE85002328/GAR
Energy Data Report: Prices and Margins of No. 2 Distillate Fuel Oil. Monthly Report, January 1982.
DE85002328/GAR *515,649* PC A02/MF A01

DE85002329/GAR
College of Idaho Geothermal System, Caldwell, Idaho.
DE85002329/GAR *514,909* PC A03/MF A01

DE85002330/GAR
Low Level Radioactive Waste Disposal Siting: A Social and Technical Plan for Pennsylvania. Volume 3. Technical Analyses.
DE85002330/GAR *515,405* PC A10/MF A01

DE85002331/GAR
Low Level Radioactive Waste Disposal Siting: A Social and Technical Plan for Pennsylvania. Volume 2. Socioeconomic Analyses.
DE85002331/GAR *515,406* PC A08/MF A01

DE85002332/GAR
Low Level Radioactive Waste Disposal Siting: A Social and Technical Plan for Pennsylvania. Volume 1. An Overview of Options and Alternatives.
DE85002332/GAR *515,407* PC A05/MF A01

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Low Level Radioactive Waste Disposal Siting: A Social and Technical Plan for Pennsylvania. Volume 4. Annotated Bibliography.
DE85002333/GAR *515,408* PC A04/MF A01

DE85002334/GAR
Nuclear Power.
DE85002334/GAR *515,563* PC A05/MF A01

DE85002345/GAR
Compact Approach to Monitored Retrievable Storage of Spent Fuel.
DE85002345/GAR *515,409* PC A02/MF A01

DE85002347/GAR
Use of Calibration Standards and the Correction for Sample Self-Attenuation in gamma-Ray Nondestructive Assay.
DE85002347/GAR *515,339* PC A03/MF A01

DE85002351/GAR
Compact Reversed-Field Pinch Reactors (CRFPR): Preliminary Engineering Considerations.
DE85002351/GAR *515,329* PC A18/MF A01

DE85002353/GAR
Model Documentation of the Gas Analysis Modeling System. Volume 1. Model Overview.
DE85002353/GAR *515,650* PC A04/MF A01

DE85002361/GAR
Assessment of Principal Oil and Gas Data Series of the Energy Information Administration.
DE85002361/GAR *515,651* PC A17/MF A01

DE85002375/GAR
Organic Complexant-Enhanced Mobility of Toxic Elements in Low-Level Wastes.
DE85002375/GAR *515,410* PC A02/MF A01

DE85002376/GAR
In Situ gamma-Ray Spectrometric Analysis of Radionuclide Distributions at a Commercial Shallow Land Burial Site.
DE85002376/GAR *515,411* PC A02/MF A01

DE85002377/GAR
Pulp and Paper Industry Energy Impacts Through Implementation of Biotechnologies.
DE85002377/GAR *515,019* PC A02/MF A01

DE85002384/GAR
Use of a Commercial Ranging System in Field Surveys of Radioactively Contaminated Sites.
DE85002384/GAR *515,354* PC A02/MF A01

DE85002385/GAR
Laser-Based Diagnostics for Coal Gasification Instrumentation.
DE85002385/GAR *515,652* PC A04/MF A01

DE85002388/GAR
Low-Energy Nuclear Reactions with Hydrogen Isotopes.
DE85002388/GAR *515,564* PC A02/MF A01

DE85002392/GAR
Cooperation and Competition on the Path to Fusion Energy.
DE85002392/GAR *515,330* PC A07/MF A01

DE85002409/GAR
Monte Carlo Simulation of the Sequential Probability Ratio Test for Radiation Monitoring.
DE85002409/GAR *515,355* PC A02/MF A01

DE85002412/GAR
Los Alamos Nuclear Plant Analyzer: An Interactive Power-Plant Simulation Program.
DE85002412/GAR *515,445* PC A02/MF A01

DE85002416/GAR
Integration of NDA Instruments into the Savannah River Plant Computer Network.
DE85002416/GAR *515,356* PC A02/MF A01

DE85002421/GAR
Nondestructive Assay System Development for a Plutonium Scrap Recovery Facility.
DE85002421/GAR *515,412* PC A02/MF A01

DE85002430/GAR
Applications of the CONTAIN 1.0 Computer Code to the Analysis of Containment Loading under Severe Accident Conditions.
DE85002430/GAR *515,383* PC A02/MF A01

DE85002435/GAR
Guide to Radiological Accident Considerations for Siting and Design of DOE Nonreactor Nuclear Facilities.
DE85002435/GAR *515,446* PC A02/MF A01

DE85002437/GAR
X-Ray Holography of Biological Specimens.

DE85002437/GAR *514,656* PC A02/MF A01

DE85002440/GAR

Diffusion of Plutonium in Compacted, Brine-Saturated Bentonite.
DE85002440/GAR *515,413* PC A02/MF A01

DE85002442/GAR

MARCON - Development and Applications to Containment Loading Calculations.
DE85002442/GAR *515,384* PC A02/MF A01

DE85002444/GAR

Comparison of Structural Computer Programs Used for the Analysis of Spent Fuel Shipping Casks.
DE85002444/GAR *515,385* PC A03/MF A01

DE85002448/GAR

Monthly Energy Review, June 1984.
DE85002448/GAR *515,653* PC A07/MF A01

DE85002459/GAR

Report of the First United States Conference on Utility Experience with Neutron Noise Analysis.
DE85002459/GAR *515,447* PC A02/MF A01

DE85002460/GAR

Photosynthetic Water Splitting.
DE85002460/GAR *515,654* PC A02/MF A01

DE85002467/GAR

Predicted Energy Savings for a Residential Heat Pump Utilizing a Fluidized-Bed Heat Exchanger.
DE85002467/GAR *515,070* PC A02/MF A01

DE85002468/GAR

In-Core Coolant Flow Monitoring of Pressurized Water Reactors Using Temperature and Neutron Noise.
DE85002468/GAR *515,448* PC A02/MF A01

DE85002469/GAR

Long-Term Automated Surveillance of a Commercial Nuclear Power Plant.
DE85002469/GAR *515,449* PC A02/MF A01

DE85002472/GAR

Large Acceptance Spectrometers for pi exp 0 Mesons.
DE85002472/GAR *515,957* PC A02/MF A01

DE85002477/GAR

Classroom Training Revision Methodology.
DE85002477/GAR *514,528* PC A02/MF A01

DE85002487/GAR

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DE85002492/GAR

Plasticity, Agglomeration and Volatiles Secondary Reactions in Coal Pyrolysis. Annual Report, September 10, 1982-February 29, 1984.
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Fundamental Combustion Studies of Low-Rank Coal Slurries. Monthly Progress Report, 1 October 1984-31 October 1984.
DE85002496/GAR *515,656* PC A02/MF A01

DE85002498/GAR

Status Report on the ORNL (Oak Ridge National Laboratory) 25 URC Accelerator.
DE85002498/GAR *515,554* PC A02/MF A01

DE85002502/GAR

Closeout Report for the Decontamination and Decommissioning of the 203-S, 204-S, 205-S Facilities.
DE85002502/GAR *515,414* PC A04/MF A01

DE85002506/GAR

Petroleum Marketing Monthly, August 1984.
DE85002506/GAR *515,657* PC A07/MF A01

DE85002515/GAR

Petroleum Marketing Monthly, August 1984.
DE85002515/GAR *515,658* PC A07/MF A01

DE85002516/GAR

ELAF Failed Fuel Plate Examination.
DE85002516/GAR *515,480* PC A03/MF A01

DE85002522/GAR

Coal Production, 1983.
DE85002522/GAR *515,659* PC A07/MF A01

DE85002527/GAR

Automated Servo Controlled Calorimetry.
DE85002527/GAR *515,206* PC A02/MF A01

DE85002530/GAR

Linear, Position-Sensitive X-Ray Detector Used for Real-Time Calculations of Small-Angle Scattering Parameters with Submillisecond Resolution.
DE85002530/GAR *515,207* PC A02/MF A01

DE85002551/GAR

STAR: Sandia Technology Applications Ring Conceptual Design Report.
DE85002551/GAR *515,555* PC A05/MF A01

DE85002552/GAR

Mound Activities in Chemical and Physical Research: January-June 1984.
DE85002552/GAR *515,340* PC A03/MF A01

DE85002557/GAR

Artificial Photosynthesis with Algal and Reconstituted Systems.
DE85002557/GAR *515,660* PC A02/MF A01

DE85002559/GAR

Development of Methods for Nuclear Power Plant Personnel Qualifications and Training.
DE85002559/GAR *514,529* PC A02/MF A01

DE85002561/GAR

Design Description of the Vacuum Vessel for the Advanced Toroidal Facility.
DE85002561/GAR *515,332* PC A02/MF A01

DE85002565/GAR

MCNP Code.
DE85002565/GAR *515,486* PC A03/MF A01

DE85002567/GAR

Assessment of Ground-Coil Heat-Pump Technology.
DE85002567/GAR *515,071* PC A02/MF A01

DE85002568/GAR

Varian Gyrotron Development Program.
DE85002568/GAR *515,333* PC A02/MF A01

DE85002587/GAR

Single-Cavity SLED Device.
DE85002587/GAR *515,556* PC A02/MF A01

DE85002593/GAR

Technique for Reduction of Coherence Function Bias Error.
DE85002593/GAR *515,208* PC A02

DE85002594/GAR

Compensation Effects in Hadron Calorimeters.
DE85002594/GAR *515,358* PC A02/MF A01

DE85002605/GAR

4 pi Detectors.
DE85002605/GAR *515,359* PC A02/MF A01

DE85002608/GAR

Summary of District Heating and Cooling Project in Moorhead, Minnesota.
DE85002608/GAR *514,940* PC A04/MF A01

DE85002610/GAR

RHIC And Quark Matter: Proposal for a Relativistic Heavy Ion Collider at Brookhaven National Laboratory.
DE85002610/GAR *515,557* PC A13/MF A01

DE85002611/GAR

Molten Salt Reactor for Dispersed Solid Phase Chlorination.
DE85002611/GAR *514,678* PC A02/MF A01

DE85002613/GAR

Hydrodesulfurization by Reduced Molybdenum Sulfides: Activity and Selectivity of Chevrel Phase Catalysts.
DE85002613/GAR *514,698* PC A02/MF A01

DE85002628/GAR

Notes on the RF System for the SLC Positron Source.
DE85002628/GAR *515,558* PC A02/MF A01

DE85002634/GAR

Utility-Interactive Photovoltaic Power Conditioning Technology in the United States.
DE85002634/GAR *514,941* PC A02/MF A01

DE85002635/GAR

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DE85002635/GAR *514,728* PC A03/MF A01

DE85002638/GAR

Thermal Effects in Radiation Processing.
DE85002638/GAR *514,729* PC A03/MF A01

DE85002646/GAR

Blackness Coefficients, Effective Diffusion Parameters, and Control Rod Worths for Thermal Reactors.
DE85002646/GAR *515,487* PC A04/MF A01

DE85002647/GAR

Differential Thermal Analysis Study of U sub 3 Si-Al and U sub 3 Si sub 2 -Al Reactions.
DE85002647/GAR *515,489* PC A03/MF A01

DE85002650/GAR

Analysis of Concentrating PV-T Systems for the Commercial/Industrial Sector. Volume IV. Design Analysis and Trade-off Study.
DE85002650/GAR *514,910* PC A14/MF A01

DE85002656/GAR

Geological and Geophysical Evidence of Structures in Northwest-Trending Washes, Yucca Mountain, Southern Nevada, and Their Possible Significance to a Nuclear Waste Repository in the Unsaturated Zone.
DE85002656/GAR *515,415* PC A03/MF A01

DE85002660/GAR

Opportunities for Energy Conservation Through Biotechnology.
DE85002660/GAR *515,661* PC A05/MF A01

DE85002661/GAR

Capabilities of Laser Diagnostics for Combustion and Flowfields.
DE85002661/GAR *515,209* PC A05/MF A01

DE85002666/GAR

Market Behavior under Partial Price Controls: The Case of the Retail Gasoline Market.
DE85002666/GAR *515,662* PC A04/MF A01

DE85002670/GAR

Shawmut Hydroelectric Redevelopment Project. Final Operation and Maintenance Report.
DE85002670/GAR *514,942* PC A06/MF A01

DE85002671/GAR

In Situ Vitrification Pilot-Scale Radioactive Test.
DE85002671/GAR *515,416* PC A04/MF A01

DE85002683/GAR

Accelerated Aging of Aluminized Acrylic Solar Mirror Materials.
DE85002683/GAR *514,911* PC A02/MF A01

DE85002686/GAR

Versatile CAMAC Power Supply Controller-Monitor with Built-in Ramping and Ripple Monitor.
DE85002686/GAR *515,210* PC A02

DE85002698/GAR

In-Situ Hydrate Thermal Measurements Project Status.
DE85002698/GAR *515,663* PC A02/MF A01

DE85002702/GAR

Collective Effects in Spin Polarized Plasmas.
DE85002702/GAR *515,572* PC A02/MF A01

DE85002703/GAR

PPPL Tokamak Program.
DE85002703/GAR *515,334* PC A03/MF A01

DE85002706/GAR

Ohm's Law for Mean Magnetic Fields.
DE85002706/GAR *515,526* PC A02/MF A01

DE85002709/GAR

Forecasts of on-Site and off-Site Occupational Requirements for Energy Construction Developments in the United States, 1983-1990.
DE85002709/GAR *514,912* PC A07/MF A01

DE85002710/GAR

Mixing, Chemical Reaction and Flow Field Development in Ducted Rockets.
DE85002710/GAR *515,597* PC A03/MF A01

DE85002711/GAR

Two-Chamber Model for Divertors with Plasma Recycling.
DE85002711/GAR *515,335* PC A02/MF A01

DE85002714/GAR

First-Wall and Limiter Conditioning in TFTR.
DE85002714/GAR *515,336* PC A02/MF A01

DE85002721/GAR

Proposal for Hollow Cathode Electron Gun for Electron Cooling.
DE85002721/GAR *515,559* PC A02/MF A01

DE85002732/GAR

Calculation of Si(Li) X-Ray Detector Efficiencies.
DE85002732/GAR *515,211* PC A02/MF A01

DE85002734/GAR

Comparison of XEDS and EELS Using Conventional Beryllium Window and Windowless Detectors.
DE85002734/GAR *515,212* PC A02/MF A01

DE85002757/GAR

Water-Lithium Bromide Double-Effect Absorption Cooling Analysis. Final Report.
DE85002757/GAR *515,072* PC A07/MF A01

DE85002760/GAR

Demulsification Tests with Merkl Fluids. Final Report, January-September 1982.
DE85002760/GAR *515,664* PC A03/MF A01

DE85002763/GAR

Ion Beam Mixing: Basic Experiments.
DE85002763/GAR *515,560* PC A03/MF A01

DE85002785/GAR

Separation of Helium-Methane Mixtures by Single-Column Pressure Swing Adsorption.
DE85002785/GAR *514,699* PC A04/MF A01

DE85002786/GAR

Evaluation of Modifications to the Mastin Double-Envelope House.
DE85002786/GAR *514,913* PC A03/MF A01

DE85002792/GAR

Leak Detectors for Organic Rankine Cycle Power Plants: On-Line and Manual Methods.
DE85002792/GAR *514,943* PC A04/MF A01

DE85002800/GAR

Toward New Coal Hydroprocessing and Liquefaction Catalysts. Progress Report, August 1983-December 1983.
DE85002800/GAR *515,665* PC A02/MF A01

DE85002811/GAR

Economic Growth and Dynamic Equilibrium.
DE85002811/GAR *514,462* PC A03/MF A01

DE85002818/GAR

Progress in Energy, 1983-1984.
DE85002818/GAR *514,914* PC A02/MF A01

DE85002968/GAR

Theta Pinch Discharges for Solids Vaporization and Elemental Chemical Analysis. Technical Progress Report.
DE85002968/GAR *514,700* PC A02/MF A01

DE85003040/GAR

3D Field Calculation of the GEM Prototype Magnet and Comparison with Measurements.
DE85003040/GAR *515,561* PC A03

DE85003056/GAR

Chemistry and Morphology of Coal Liquefaction. Annual Report, October 1, 1983-September 30, 1984.
DE85003056/GAR *515,666* PC A03/MF A01

DE85003058/GAR

Steam Stripping of Oil Shale Wastewaters. LBL/SEEHRL Steam Stripper: Design, Operation, and Maintenance Manual.
DE85003058/GAR *515,089* PC A07/MF A01

NTIS ORDER/REPORT NUMBER INDEX

DE85003109/GAR
Special Function Instruments for Binary Cycle Geothermal Power Plants.
DE85003109/GAR *514,915* PC **A02/MF A01**

DE85003134/GAR
Short-Term Energy Outlook. Quarterly Projections, October 1984.
DE85003134/GAR *514,916* PC **A04/MF A01**

DE85003152/GAR
Recommendations for Energy Conservation Standards and Guidelines for New Commercial Buildings. Volume III. Description of the Test Process. Appendix C: Life-Cycle Code Documentation.
DE85003152/GAR *514,917* PC **A13/MF A01**

DE85003168/GAR
Modeling Tax Credit Incentives for Business Investment in Selected Energy Conservation and Production Technologies.
DE85003168/GAR *514,918* PC **A12/MF A01**

DE85003169/GAR
Education and Training Plan for the US DOE Office of Classification.
DE85003169/GAR *514,530* PC **A06/MF A01**

DE85003172/GAR
Program of Basic Research on the Preparation and Stability of Coal/Water Slurries. Quarterly Report.
DE85003172/GAR *514,766* PC **A04/MF A01**

DE85003173/GAR
Produced Fluid Emulsions. Final Report.
DE85003173/GAR *514,679* PC **A07/MF A01**

DE85003188/GAR
Aerosol Formation from Pulverized Coal Combustion. Quarterly Reports 1, 2 and 3.
DE85003188/GAR *515,667* PC **A04/MF A01**

DE85900002/GAR
Method of Final Conditioning of Solid Radioactive Wastes.
DE85900002/GAR *515,417* PC **A02**

DFVLR-FB-83-24
Carrier Acquisition and Tracking by a COSTAS Loop with Automatic Frequency Control.
N85-13149/8/GAR *515,288* PC **A04/MF A01**

DFVLR-FB-84-22
Mathematical Models for the Boiling Diagram of the Ideal Two-Component Mixture.
N85-13000/3/GAR *514,701* PC **A03/MF A01**

DFVLR-MITT-83-17
Model Equations Describing Unsteady Fluid Motion.
N85-13194/4/GAR *515,533* PC **A03/MF A01**

DFVLR-MITT-84-07
Formats for Numerical and Textual Data in Data Processing.
N85-13504/4/GAR *514,826* PC **A04/MF A01**

DFVLR-MITT-84-12
Colloquium About Joint Projects within DFVLR/ISRO(Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt/Indian Space Research Organization, Bangalore, Satellite Centre) Cooperation.
N85-12907/0/GAR *515,703* PC **A08/MF A01**

DGT-23.428/A
Essai 17.208: Statistique sur les Caracteristics de Base des Composites Carbone-Epoxy (Traction) (Test Report No. 17.208: Statistics of the Basic Characteristics of Carbon-Epoxy Composites).
N85-12979/9/GAR *514,975* PC **A04/MF A01**

DGT-24.322
Essai 17.202: Caracterisation de Resine Polyimide (Polyimide Resin Characteristics, Test).
N85-13049/0/GAR *514,979* PC **A03/MF A01**

DNA-6321F
Operations FLINTLOCK and LATCHKEY Events RED HOT, PIN STRIPE, DISCUS THROWER, PILE DRIVER, DOUBLE PLAY, NEWPOINT, MIDI MIST, 5 March 1966-26 June 1967.
AD-A148 997/0/GAR *515,342* MF **A01**

DOE/BC/00046-25
Produced Fluid Emulsions. Final Report.
DE85003173/GAR *514,679* PC **A07/MF A01**

DOE/BC/10325-7
Heavy Oil Processing Utilizing the Dynacracking Process. Final Report.
DE85000176/GAR *515,613* PC **A06/MF A01**

DOE/BC/10660-1
Demulsification Tests with Merkl Fluids. Final Report, January-September 1982.
DE85002760/GAR *515,664* PC **A03/MF A01**

DOE/BC/[illegible]0-3
Strategic P[illegible]oleum Reserve Supporting Research. Quarterly Report, April 1-June 30, 1984.
DE85002161/GAR *515,635* PC **A02/MF A01**

DOE/BP-277
Environmental Assessment of Industrial Process Energy Conservation Measures. Final Report.
DE85000186/GAR *514,895* PC **A08/MF A01**

DOE/BP-320-PT.1
BPA (Bonneville Power Administration) Review of Washington Public Power Supply System, Projects 1 and 3 (WNP 1 and 3): Construction Schedule and Financing Assumptions. Draft Study Report, Part 1.
DE85001176/GAR *515,439* PC **A02/MF A01**

DOE/BP-327
Pacific Northwest Residential Energy Consumption Survey, Spring 1983. Exhibit Booklet.
DE85000490/GAR *514,898* PC **A04/MF A01**

DOE/BP-330
Pacific Northwest Residential Energy Survey, Spring 1983.
DE85000486/GAR *514,897* PC **A02/MF A01**

DOE/CE/15135-T1
Vertical Solar Louver Project. Final Technical Report.
DE84017335/GAR *515,083* PC **A02/MF A01**

DOE/CE/15143-T1
Project on Sulfur Dioxide Removal and Waste Products Utilization Process. Final Report.
DE84017333/GAR *515,084* PC **A05/MF A01**

DOE/CH/10211-1
Effects of gamma Radiation on the Sweet Potato Weevil, Cylas Formicarius Elegantulus (Summers). Progress Report, June 1984-August 1984.
DE85001412/GAR *514,370* PC **A02/MF A01**

DOE/CS/40069-T1
Energy Management: Theory and Practice. Final Report.
DE85000646/GAR *514,901* PC **A03/MF A01**

DOE/CS/50271-T1
Methanol Engine Conversion Feasibility Study: Phase 1.
DE85000994/GAR *515,691* PC **A07/MF A01**

DOE/DF-85/001
Interstate Pipeline's Annual Report of Gas Supply, 1981-1983 (FERC-15).
PB85-128064/GAR *514,768* CP **T02**

DOE/EA-0243
Environmental Assessment on Construction of the Minthorn Springs Creek Juvenile Acclimation and Adult Holding Facility.
DE85000918/GAR *514,570* PC **A02/MF A01**

DOE/EA-0245
Environmental Assessment on Construction of the Cabinet Gorge Kokanee Hatchery.
DE85000785/GAR *514,569* PC **A03/MF A01**

DOE/EIA-0013(81/12)
Energy Data Report: Prices and Margins of No. 2 Distillate Fuel Oil. Monthly Report, December 1981.
DE85002294/GAR *515,648* PC **A02/MF A01**

DOE/EIA-0013(82/01)
Energy Data Report: Prices and Margins of No. 2 Distillate Fuel Oil. Monthly Report, January 1982.
DE85002328/GAR *515,649* PC **A02/MF A01**

DOE/EIA-0013(82/10)
Energy Data Report: Prices and Margins of No. 2 Distillate Fuel Oil. Monthly Report, October 1982.
DE85002278/GAR *515,640* PC **A02/MF A01**

DOE/EIA-0013(82/11)
Energy Data Report: Prices and Margins of No. 2 Distillate Fuel Oil. Monthly Report, November 1982.
DE85002279/GAR *515,641* PC **A02/MF A01**

DOE/EIA-0035(84/06)
Monthly Energy Review, June 1984.
DE85002448/GAR *515,653* PC **A07/MF A01**

DOE/EIA-0075(81/11)
Cost and Quality of Fuels for Electric Utility Plants, November 1981.
DE85002290/GAR *515,647* PC **A04/MF A01**

DOE/EIA-0109(84/08)
Petroleum Supply Monthly, August 1984.
DE85000026/GAR *515,606* PC **A06/MF A01**

DOE/EIA-0118(83)
Coal Production, 1983.
DE85002522/GAR *515,659* PC **A07/MF A01**

DOE/EIA-0130(81/09)
Natural Gas Monthly Report, September 1981. Energy Data Report.
DE85002260/GAR *515,637* PC **A02/MF A01**

DOE/EIA-0130(81/10)
Natural Gas Monthly Report, October 1981. Energy Data Report.
DE85002261/GAR *515,638* PC **A02/MF A01**

DOE/EIA-0130(81/11)
Energy Data Report: Natural Gas Monthly Report, November 1981.
DE85002275/GAR *515,639* PC **A02/MF A01**

DOE/EIA-0130(82/01)
Energy Data Report: Natural Gas Monthly Report, January 1982.
DE85002280/GAR *515,642* PC **A02/MF A01**

DOE/EIA-0130(82/02)
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Solar Photochemical Process Engineering for Production of Fuels and Chemicals.
DE85000335/GAR *515,616* PC A05/MF A01

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Stirling Material Technology.
N85-13007/8/GAR *515,692* PC A02/MF A01

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6000 Tpd SRC-I Demonstration Plant Gas Systems. Design Baseline Package. Volume 10.
DE85001217/GAR *515,625* PC A08/MF A01

DOE/OR/03054-T28
General Engineering Specifications for 6000 Tpd SRC-I Demonstration Plant.
DE85000032/GAR *515,610* PC A20/MF A01

DOE/OR/03054-T29
General Engineering Specifications for 6000 Tpd SRC-I Demonstration Plant.
DE85000031/GAR *515,609* PC A25/MF A01

DOE/OR/03054-T30
General Engineering Specifications for 6000 Tpd SRC-I Demonstration Plant.
DE85000033/GAR *515,611* PC A19/MF A01

DOE/OR/03054-T32
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DOE/OR/21390-T2
Economic Analysis of Three Methods to Dry Biomass Fuels.
DE85000178/GAR *515,614* PC A06/MF A01

DOE/OR/21400-3
Program Plan for Research and Development of Dielectric Materials for Electric Power Systems.
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Options for Coordinating Low-Income Fuel Assistance with Weatherization and Conservation Services.
DE85002169/GAR *514,461* PC A15/MF A01

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Wet Grinding Versus Dry Grinding for Deep Cleaning Ultrafine Coal by Flotation. Technical Progress Report.

NTIS ORDER/REPORT NUMBER INDEX

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DOE/R4/16210-T1

Hollow Ceramic Block: Containment of Water for Thermal Storage in Passive Solar Design. Final Technical Report.
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Direct Coal Combustion Data Handbook.
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DOE/SF/16581-016

Medium Power Transformers, 115 KV and Below with and Without LTC.
DE85001377/GAR *514,708* PC A04/MF A01

DOE/SF/16540-T2

Water-Lithium Bromide Double-Effect Absorption Cooling Analysis. Final Report.
DE85002757/GAR *515,072* PC A07/MF A01

DOE/SF/11939-T1

Photosynthesis of Ammonia.
DE85001482/GAR *514,677* PC A03/MF A01

DOE/UMT-0220

Predicting Long-Term Moisture Contents of Earthen Covers at Uranium Mill Tailings Sites.
DE85000777/GAR *515,392* PC A03/MF A01

DOT/FAA/AP-84/18

Sector Suite Man/Machine Functional Capabilities and Performance Requirements.
AD-A148 881/6/GAR *514,803* PC A18/MF A01

DOT/FAA/PM-84/23

Structural Design Guidelines for Heliports.
AD-A148 967/3/GAR *514,345* PC A06/MF A01

DOT-HS-806-628

Effects of Side Impact Padding on Driver Performance.
PB85-136372/GAR *515,129* PC A05/MF A01

DP-116

Some Issues in Dynamic Modelling and Forecasting.
PB85-139050/GAR *514,468* PC E04/MF E04

DR/CG-157-84

Directory of Range Data Conversion and Processing Systems.
AD-A148 996/2/GAR *515,273* PC A23/MF A01

DREO-TN-82-25

Strapdown Navigation Algorithms Implemented in the Inertial and Geographic Frames.
AD-A148 908/7/GAR *515,301* PC A04/MF A01

DREO-TN-83-31

Comparison of Nomex and Evolution 3 for Use in Tent Liners.
AD-A149 057/2/GAR *514,984* PC A02/MF A01

DREO-TN-84-5

Alignment Fixture for a Two-Degree-of-Freedom (TDF) Gyroscope.
AD-A148 985/7/GAR *515,300* PC A02/MF A01

DSA/DF-65/003

H8-1 and H8-2 Cataloging Handbooks.
PB85-120483/GAR *514,451* CP T11

DTNSRDC/CMLD-84-11

Computer Center CDC Libraries.
AD-A149 005/1/GAR *514,812* PC A06/MF A01

E65-10032

LANDSAT Instruments Characterization.
N85-13356/9/GAR *514,822* PC A02/MF A01

E85-10036

Investigation of Several Aspects of LANDSAT 4/5 Data Quality.
N85-13357/7/GAR *514,823* PC A02/MF A01

E-2042

Effect of Lubricant Extreme-Pressure Additives on Surface Fatigue Life of AISI 9310 Spur Gears.
N85-13234/8/GAR *515,165* PC A02/MF A01

E-2127

Effect of Two Inner-Ring Oil-Flow Distribution Schemes on the Operating Characteristics of a 35 Millimeter Bore Ball Bearing to 2.5 Million Dn.
N85-13233/0/GAR *515,165* PC A02/MF A01

E-2184

Effect of Humidity on Fretting Wear of Several Pure Metals.
N85-13006/0/GAR *514,992* PC A02/MF A01

E-2219

Effect of Barrier Height on Friction Behavior of the Semiconductors Silicon and Gallium Arsenide in Contact with Pure Metals.
N85-13044/1/GAR *514,791* PC A02/MF A01

E-2271

High-Temperature Erosion of Plasma-Sprayed, Yttria-Stabilized Zirconia in a Simulated Turbine Environment.
N85-13045/8/GAR *514,961* PC A02/MF A01

E-2282

Experimental Investigation of Shock-Cell Noise Reduction for Single Stream Nozzles in Simulated Flight.
N85-13550/7/GAR *515,688* PC A17/MF A01

E-2283

Experimental Investigation of Shock-Cell Noise Reduction for Dual-Stream Nozzles in Simulated Flight.
N85-13549/9/GAR *515,687* PC A09/MF A01

E-2333

Static Jet Noise Test Results of Four 0.35 Scale-Model QCGAT(Quiet Clean General Aviation Turbofan) Mixer Nozzles.
N85-13551/5/GAR *515,689* PC A03/MF A01

E-2334

Liquid Phase Products and Solid Deposit Formation from Thermally Stressed Model Jet Fuels.
N85-13068/4/GAR *515,688* PC A03/MF A01

ECON-82-180-1

Windows for Innovation: A Story of Two Large-Scale Technologies.
PB85-150340/GAR *515,294* PC A18/MF A01

EDA-ERD-84-079

Regional Investment Strategies: Information and Analytical Tools.
PB85-144335/GAR *514,482* PC A04/MF A01

EDA/RED-84-65

Stability of Commodity Trade Flows in Interregional Input-Output Tables.
PB85-146108/GAR *514,487* PC A06/MF A01

EES-611

Guidelines for Left-Turn Treatments at Signal Controlled Intersections.
PB85-144327/GAR *515,108* PC A13/MF A01

EGG-SE-6696

ELAF Failed Fuel Plate Examination.
DE85002516/GAR *515,460* PC A03/MF A01

EGG-2037-VOL-22

LOFT (Loss-of-Fluid Test) Experimental Measurements Uncertainty Analysis. Volume 22. Fission Product Detection System Instruments Recorded on the DAVDS (Data Acquisition and Visual Display System).
NUREG/CR-0169-V22/GAR *515,450* PC A03/MF A01

EGG-2345

BURYIT/ANALYZ: A Computer Package for Assessment of Radiological Risk of Low-Level Radioactive Waste Land Disposal. User's Manual,
NUREG/CR-3994/GAR *515,425* PC A07/MF A01

EGG-2348

Interim Criteria for the Use of Programmable Digital Devices in Safety and Control Systems.
NUREG/CR-4017/GAR *515,456* PC A03/MF A01

EGG-2359

Particulate and Gas Release from Light-Water-Reactor (LWR) Fuel Rods Stored in Inert and Dry Air Atmospheres.
NUREG/CR-4056/GAR *515,420* PC A02/MF A01

EGG-2369

International Standard Problem 13 (LOFT Experiment L2-5) Final Comparison Report.
NUREG/CR-4115/GAR *515,460* PC A11/MF A01

EPA/450/2-84/006

Maps Depicting Nonattainment Areas Pursuant to Section 107 of the Clean Air Act - 1984,
PB85-140830/GAR *515,097* PC A11/MF A01

EPA/450/5-83/006R

Review and Evaluation of the Evidence for Cancer Associated with Air Pollution.
PB85-142016/GAR *514,670* PC A13/MF A01

EPA/460/A-85/1

Application for Certification 1985 Model Year Light-Duty Vehicles - American Motors Corporation - Renault.
PB85-136513/GAR *515,130* PC$51.00/MF$14.50

EPA/460/A-85/2

Application for Certification 1985 Model Year Light-Duty Vehicles - BMW AG.
PB85-136521/GAR *515,131* PC$60.50/MF$14.80

EPA/460/A-85/3

Application for Certification 1985 Model Year Light-Duty Vehicles - Chrysler.
PB85-136539/GAR *515,132* PC$219.00/MF$22.60

EPA/460/A-85/4

Application for Certification 1985 Model Year Light-Duty Vehicles - General Motors.
PB85-136547/GAR *515,133* PC$134.50/MF$18.40

EPA/460/A-85/5

Application for Certification 1985 Model Year Light-Duty Vehicles - Mazda.
PB85-136554/GAR *515,134* PC$55.00/MF$14.50

EPA/460/A-85/6

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ISL-R-131/83
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PB85-144533/GAR *514,327* PC **E04/MF E04**

ISL-RT-501/84
Etude, par la Methode de Coin, de la Composition B2141 (SNPE): Correlation entre l'Amorcabilite et la Formulation d'un Explosif a Liant Plastique (Wedge-Technique Investigation of Composite Explosive B2141 (SNPE). Correlation between Ignitability and Formation of an Explosive with Plastic Bond).
PB85-141596/GAR *515,502* PC **E04/MF E04**

ISL-RT-504/84
Mise au Point d'un Laser HF de Faible Puissance (Perfecting a Low-Power HF Laser).
PB85-145076/GAR *515,548* PC **E04/MF E04**

ISWS/BULL-60(29)/83
Public Groundwater Supplies in Will County.
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JACKFAU-84-316
National Energy Accounts, 1958-1981.
PB85-142024/GAR *514,924* PC **A10/MF A01**

JPL-PUB-84-14
Evaluation of Heat Engine for Hybrid Vehicle Application.
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JPL-PUB-84-19
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JPL-PUB-84-29
International Test and Demonstration of a 1-Mw Wellhead Generator: Helical Screw Expander Power Plant.
N85-13372/6/GAR *514,946* PC **A11/MF A01**

JPL-PUB-84-31
Solar Photochemical Process Engineering for Production of Fuels and Chemicals.
DE85000335/GAR *515,616* PC **A05/MF A01**

JPL-PUB-84-32
Review of Solar Fuel-Producing Quantum Conversion Processes.
DE85000336/GAR *515,617* PC **A05/MF A01**

JPL-PUB-84-33
Mission Science Value-Cost Savings from the Advanced Imaging Communication System (AICS) (Advanced Imaging Communication System).
N85-12905/4/GAR *515,283* PC **A03/MF A01**

JPL-PUB-84-42
Coastal Zone Color Scanner (CZCS): Imagery of Near-Surface Phytoplankton Pigment Concentrations from the First Coastal Ocean Dynamics Experiment (CODE-1), March - July 1981.
N85-13447/6/GAR *514,733* PC **A05/MF A01**

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Technologies for Space Station Autonomy.
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Experimental Investigation of Two-Dimensional Thrust Augmenting Ejectors, Part 1.
N85-12894/0/GAR *515,684* PC **A06/MF A01**

JPL-PUB-84-50-PT-2
Experimental Investigation of Two-Dimensional Thrust Augmenting Ejectors, Part 2.
N85-12895/7/GAR *515,685* PC **A05/MF A01**

JUEL-1916
PRIAMUS: Ein Rechenprogramm zur Bestimmung Thermophysikalischer Stoffwerte von Gasmischungen Aus O2, N2, CO, CO7, He, H2O, H2 und CH4 (PRIAMUS, a Computer Program for the Calculation of Thermophysical Properties of Gas Mixtures Containing O2, N2, CO, CO2, He, H2O, H2, CH4).
N85-13002/9/GAR *514,703* PC **A04/MF A01**

K/TS-11-504
Applications of Pulsed-Laser Techniques and Thermographic Phosphors to Dynamic Thermometry of Rotating Surfaces.
DE85000403/GAR *515,202* PC **A02/MF A01**

K/TS-5360
Pilot Program for an Automated Data Collection System.
DE84016809/GAR *515,473* PC **A02**

KMSF-U1526
Two-Stage Free Electron Laser Research.
AD-A148 951/7/GAR *515,543* PC **A03/MF A01**

KNMI-TR-48
Inzameling en Opslag van Cabauwmetingen: Een Systeemvoorstel (Acquisition and Storage of Cabauw Measurements: A System Proposal).
N85-13434/4/GAR *514,417* PC **A04/MF A01**

KNMI-TR-49
Operationele Numerieke Voorspellingen: Overzicht en Verifikatie over de Periode 1978-1983 (Operational Numerical Forecasts: Survey and Verification over the Period 1978-1983).
N85-13435/1/GAR *514,418* PC **A03/MF A01**

KU-FRL-510-1
Preliminary Checkout, Evaluation and Calibration of a 3-Component Force Measurement System for Calibrating Propulsion Simulators for Wind Tunnel Models.
N85-12903/9/GAR *515,220* PC **A09/MF A01**

L-15738
Evaluation of the Langley 4- by 7-Meter Tunnel for Propeller Noise Measurements.
N85-13553/1/GAR *515,229* PC **A03/MF A01**

L-15750
Oil-Flow Study of a Space Shuttle Orbiter Tip-Fin Controller.
N85-12920/3/GAR *515,714* PC **A04/MF A01**

L-15764
Full-Scale Crash-Test Evaluation of Two Load-Limiting Subfloors for General Aviation Airframes.
N85-13267/8/GAR *514,938* PC **A04/MF A01**

L-15768
Local Stability Analysis for a Planar Shock Wave.
N85-12864/3/GAR *515,530* PC **A02/MF A01**

L-15784
Buckling Analysis for Rectangular Orthotropic Plates with Centrally Located Cutouts.
N85-13268/6/GAR *515,578* PC **A03/MF A01**

L-15838
Conceptual Design for Scaled Truss Antenna Flight Experiment.
N85-12932/8/GAR *515,717* PC **A03/MF A01**

L-15857
Tough Composite Materials.
N85-12941/9/GAR *514,973* PC **A17/MF A01**

LA-TR-84-33
Present Status of Uranium-Plutonium Mixed Carbide Fuel Development for LMFBR.
DE84017212/GAR *515,474* PC **A02**

LA-TR-84-50
Piezoelectric Stress Transducer Used for Measurements of Explosions in Hard Rock.
DE85000300/GAR *515,509* PC **A02/MF A01**

LA-UR-84-1948
Market Study of International Needs for New Electric Generating Capacity.
DE84014042/GAR *514,878* PC **A02/MF A01**

LA-UR-84-2585
Toroidal Fusion Core Experiment (TFCX) Studies.
DE84016813/GAR *515,309* PC **A02/MF A01**

LA-UR-84-2782
Application of Wald's Sequential Probability Ratio Test to Nuclear Materials Control.
DE85002017/GAR *515,479* PC **A02/MF A01**

LA-UR-84-3055
Time-of-Flight Isochronous (TOFI) Spectrometer for Direct Mass Measurements of Exotic Light Nuclei.
DE85002050/GAR *515,352* PC **A02/MF A01**

LA-UR-84-3233
Recent Development in Pyrochemistry at Los Alamos.
DE85000174/GAR *515,388* PC **A02/MF A01**

LA-UR-84-3252
Geothermal Pumping Systems.
DE85002246/GAR *514,907* PC **A02/MF A01**

LA-UR-84-3284
Interfacing Systems Loss-of-Coolant Accident in Oconee-1 Pressurized Water Reactor.
DE85000175/GAR *515,436* PC **A02/MF A01**

LA-UR-84-3292
Laser-Based Diagnostics for Coal Gasification Instrumentation.
DE85002385/GAR *515,652* PC **A04/MF A01**

LA-UR-84-3298
Use of a Commercial Ranging System in Field Surveys of Radioactively Contaminated Sites.
DE85002384/GAR *515,354* PC **A02/MF A01**

LA-UR-84-3318
Los Alamos Nuclear Plant Analyzer: An Interactive Power-Plant Simulation Program.
DE85002412/GAR *515,445* PC **A02/MF A01**

LA-UR-84-3340
X-Ray Holography of Biological Specimens.
DE85002437/GAR *514,656* PC **A02/MF A01**

LA-UR-84-3349
Low-Energy Nuclear Reactions with Hydrogen Isotopes.
DE85002388/GAR *515,564* PC **A02/MF A01**

LA-UR-84-3379
Nondestructive Assay System Development for a Plutonium Scrap Recovery Facility.
DE85002421/GAR *515,412* PC **A02/MF A01**

LA-UR-84-3380
Monte Carlo Simulation of the Sequential Probability Ratio Test for Radiation Monitoring.
DE85002409/GAR *515,355* PC **A02/MF A01**

LA-UR-84-3394
Integration of NDA Instruments into the Savannah River Plant Computer Network.
DE85002416/GAR *515,356* PC **A02/MF A01**

LA-UR-84-3448
Guide to Radiological Accident Considerations for Siting and Design of DOE Nonreactor Nuclear Facilities.
DE85002435/GAR *515,446* PC **A02/MF A01**

LA-10022-MS
Compact Approach to Monitored Retrievable Storage of Spent Fuel.
DE85002345/GAR *515,409* PC **A02/MF A01**

LA-10045
Use of Calibration Standards and the Correction for Sample Self-Attenuation in gamma-Ray Nondestructive Assay.
DE85002347/GAR *515,339* PC **A03/MF A01**

LA-10074-MS
Evaluation of the sup 63 Cu Activation Foil for Determining the Neutron Dose in the Energy Range of 1 EV to 1 MeV.
DE85001536/GAR *515,350* PC **A02/MF A01**

LA-10159-LLWM
Distribution of Radionuclides and Water in Bandelier Tuff Beneath a Former Los Alamos Liquid Waste Disposal Site after 33 Years.
DE85001406/GAR *515,402* PC **A04/MF A01**

LA-10200-MS
Compact Reversed-Field Pinch Reactors (CRFPR): Preliminary Engineering Considerations.
DE85002351/GAR *515,329* PC **A18/MF A01**

LA-10226-M
Universal Fast Breeder Reactor Subassembly Counter Manual.
DE85001523/GAR *515,349* PC **A04/MF A01**

LBL-18144
Measurement of Fenestration Net Energy Performance: Considerations Leading to Development of the Mobile Window Thermal Test (MoWiTT) Facility.
DE85000711/GAR *515,120* PC **A02/MF A01**

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Polymeric Electrolytes for Ambient Temperature Lithium Batteries. Final Report.
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LBL-18289
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DE85001650/GAR *514,697* PC **A02/MF A01**

LBL-18380
GSI-LBL Plastic Ball/Wall Spectrometer.
DE85001651/GAR *515,351* PC **A03/MF A01**

LBL-18456
Chemistry and Morphology of Coal Liquefaction. Annual Report, October 1, 1983-September 30, 1984.
DE85003056/GAR *515,666* PC **A03/MF A01**

LBL-18531
Molecular Dynamics Study of the Reaction: H Sub 2 + OH Yields H sub 2 O + H.
DE85000624/GAR *514,694* PC **A03/MF A01**

LCS-TR-7
Smoothing with Split Linear Fits.
AD-A149 032/5/GAR *515,024* PC **A03/MF A01**

LIDS-P-1397
Multi Target Tracking by Dynamic Scene Analysis.
AD-A148 922/8/GAR *515,307* MF **A01**

NTIS ORDER/REPORT NUMBER INDEX

LMF-111
Biological Characterization of Radiation Exposure and Dose Estimates for Inhaled Uranium Milling Effluents - Annual Progress Report, April 1, 1983-March 31, 1984.
NUREG/CR-3984/GAR *514,657* PC A02/MF A01

LP-207
Focusing Effects of a Laser Beam in the Nonresonant Multiphoton Ionization MPI(Multiphoton Ionization) of Gases.
N85-13231/4/GAR *515,573* PC A03/MF A01

LPI-CONTRIB-540
Conference on the Origin of the Moon.
N85-13709/9/GAR *514,396* PC A04/MF A01

M04
Department of Defense Civilian Manpower Statistics.
AD-A149 019/2/GAR *514,521* PC A02/MF A01

M-471
Global Matrix of Thermospheric Density Values for Selected Solar/Geomagnetic Conditions and Spacecraft Orbital Attitudes.
N85-13409/6/GAR *514,407* PC A05/MF A01

MA-MD-820-85010
U.S.-Flag Crosstrading. Volume 1. Executive Summary.
PB85-146553/GAR *514,488* PC A02/MF A01

MA-MD-820-85011
U.S.-Flag Crosstrading. Volume 2. U.S.-Flag Crosstrading Operations and U.S. Policy Options.
PB85-146561/GAR *514,489* PC A06/MF A01

MA-MD-820-85012
U.S.-Flag Crosstrading. Volume 3. Impediments to U.S.-Flag Crosstrading Operations.
PB85-146579/GAR *514,490* PC A04/MF A01

MCR-84-549
Evaluation of Automated Decisionmaking Methodologies and Development of an Integrated Robotic System Simulation.
N85-13516/8/GAR *514,828* PC A08/MF A01

MDC-H1295-V-1
Human Role in Space. Volume 1. Executive Summary.
N85-13473/2/GAR *515,709* PC A03/MF A01

MDC-H1295-V-2
Human Role in Space. Volume 2. Research Analysis and Technology Report.
N85-13474/0/GAR *515,710* PC A14/MF A01

MDC-H1295-V-3
Human Role in Space. Volume 3: Generalizations on Human Roles in Space.
N85-13475/7/GAR *515,711* PC A04/MF A01

MDC-J2618
System Status Display Information.
N85-12880/0/GAR *514,341* PC A04/MF A01

MIT/BHL-83-2
Separation of Helium-Methane Mixtures by Single-Column Pressure Swing Adsorption.
DE85002785/GAR *514,699* PC A04/MF A01

MIT/EL-84/007
Ponding of Effluents from Fossil Fuel Steam Electric Power Plants.
PB85-144244/GAR *515,106* PC A09/MF A01

MIT/EL-84/008
Eulerian-Lagrangian Analysis of Pollutant Transport in Shallow Water.
PB85-144269/GAR *515,107* PC A07/MF A01

MIT/EL-84/011
Titan: An Advanced Three Dimensional Coupled Neutronic/Thermal-Hydraulics Code for Light Water Nuclear Reactor Core Analysis.
PB85-144251/GAR *515,470* PC A22/MF A01

MIT/EL-84/012
TEA: A Linear Frequency Domain Finite Element Model for Tidal Embayment Analysis.
PB85-142719/GAR *514,739* PC A08/MF A01

MIT/EL-84/013
Loop Simulation Capability for Sodium-Cooled Systems.
PB85-144236/GAR *515,469* PC A10/MF A01

MIT/EL-84/014
Titan Code Development for Application to a PWR Steam Line Break Accident, 1983-84.
PB85-142693/GAR *515,466* PC A07/MF A01

MIT/EL-84/015
Ambient Monitoring of Pollutants Around Synfuel Plants.
PB85-142701/GAR *515,100* PC A03/MF A01

MIT/EL-84/017
Internal Seal for Repairing Natural Gas Mains.
PB85-142685/GAR *514,957* PC A07/MF A01

MIT/EL-84/018
Disparities in Nuclear Power Plant Performance in the United States and the Federal Republic of Germany.
PB85-142735/GAR *515,467* PC A04/MF A01

MIT/LCS/TR-310
Cohesion in Computer Text Generation: Lexical Substitution.
AD-A148 990/5/GAR *514,811* PC A06/MF A01

MLM-MU-84-69-0001
Waste Accountability, Shipping, and Packaging (WASP) Handbook.
DE85001535/GAR *515,381* PC A13/MF A01

MLM-3193
Production of HD Gas by Controlled Reaction of LiAlD sub 4 and H sub 2 O.
DE85000420/GAR *514,675* PC A02/MF A01

MLM-3195
Mound Activities in Chemical and Physical Research: January-June 1984.
DE85002552/GAR *515,340* PC A03/MF A01

MLM-3199(OP)
Automated Servo Controlled Calorimetry.
DE85002527/GAR *515,206* PC A02/MF A01

MPIS-9/1984
Rotationsinelastic Streuung von He-Atoms an HF-, HCl-, CF4-, SF6-, C2H6- und C2F6-Molekuelen (Rotational Inelastic Scattering of He-Atoms at HF-, HCl-, CF4-, SF6-, C2H6- and C2F6-Molecules).
N85-13590/3/GAR *514,710* PC A10/MF A01

MPIS-15/1983
Untersuchung der K Wechselwirkung bei Stossenergien Zwischen 0.5 und 5.7 Ev (Investigation on K (4 2P3/2) Hg Interaction at Collision Energies from 0.5 to 5.7 Ev).
N85-13589/5/GAR *514,709* PC A02/MF A01

MPL-U-19/84
Richardson Number Criterion for the Nonlinear Stability of Three-Dimensional Stratified Flow.
AD-A148 971/5/GAR *515,528* PC A02/MF A01

MPL-U-65/83
An Oceanic Reverberation Model.
AD-A149 000/2/GAR *515,515* PC A02/MF A01

MPL-U-66/83
Surface Projections of Array Beam Patterns.
AD-A148 990/6/GAR *515,278* PC A02/MF A01

MPL-U-71/84
Active Baffle Development under ACSAS Task II Hydrophone and Inner Decoupler.
AD-A148 877/4/GAR *515,253* PC A02/MF A01

MPQ-86
Improved Sensitivities in Laser Interferometers for the Detection of Gravitational Waves.
N85-13232/2/GAR *515,574* PC A02/MF A01

MPR-7
Development of Acceptance Criteria for Batches of Silane Primer for External Tank Thermal Protection System Bonding Applications.
N85-13043/3/GAR *514,681* PC A05/MF A01

MRC-TSR-2759
Symmetry Breaking for a Class of Semi-Linear Elliptic Problems.
AD-A149 093/7/GAR *515,034* PC A03/MF A01

MRC-TSR-2760
Remark on Regularization in Hilbert Spaces.
AD-A149 046/5/GAR *515,027* PC A02/MF A01

MRC-TSR-2761
Neumann Type Boundary Conditions for Hamilton-Jacobi Equations.
AD-A149 069/7/GAR *515,031* PC A03/MF A01

MRC-TSR-2762
Note on the Disturbance Decoupling Problem for Retarded Systems.
AD-A149 045/7/GAR *515,026* PC A02/MF A01

MRC-TSR-2763
Controlled Approximation and a Characterization of the Local Approximation Order.
AD-A149 095/2/GAR *515,036* PC A02/MF A01

MRC-TSR-2765
Regenerative Structure of Markov Chains Simulated via Common Random Numbers.
AD-A149 092/9/GAR *515,033* PC A02/MF A01

MRC-TSR-2766
Robust Kalman Filtering and Its Applications.
AD-A149 044/0/GAR *515,025* PC A03/MF A01

MRC-TSR-2769
Hamilton-Jacobi Equations in Infinite Dimensions. Part 1. Uniqueness of Viscosity Solutions.
AD-A149 094/5/GAR *515,035* PC A03/MF A01

MRC-TSR-2770
Recent Developments and Open Problems in the Mathematical Theory of Viscoelasticity.
AD-A149 043/2/GAR *515,576* PC A02/MF A01

MRC-TSR-2772
Asymptotic Representation of Solutions of the Basic Semiconductor Device Equations.
AD-A149 040/8/GAR *514,783* PC A04/MF A01

MRC-TSR-2775
Perturbation of a Multiple Eigenvalue in the Benard Problem for Two Fluid Layers.
AD-A149 068/9/GAR *515,529* PC A03/MF A01

MRDL-13
Laboratory Investigation of Marina Entrances on the Missouri River.
AD-A148 858/4/GAR *515,077* PC A03/MF A01

MRL-R-916
Effects of Impurities and Additives on the Growth of Polycrystalline TNT.
AD-A149 065/3/GAR *514,691* PC A02/MF A01

MRL-R-921
Extracts from Symposium Countersurveillance '83 Held at Melbourne, Australia on 27 and 28 April, 1983.
AD-A149 086/1/GAR *515,299* PC A06/MF A01

MRL-R-928
Railgun Plasma Armature Characterisation Experiments.
AD-A149 083/8/GAR *514,784* PC A03/MF A01

MRL-0309-TR
Study of the Requirements of an Electronic Message Handling Facility.
AD-A149 087/9/GAR *514,819* PC A04/MF A01

N85-12858/5/GAR
Aeronautical Engineering, a Continuing Bibliography with Indexes.
N85-12858/5/GAR *514,315* PC$6.00

N85-12859/3/GAR
Analysis of Physical-Chemical Processes Governing SSME Internal Fluid Flows.
N85-12859/3/GAR *515,696* PC A02/MF A01

N85-12860/1/GAR
Study of Flow Past an Airfoil with a Jet Issuing from Its Lower Surface.
N85-12860/1/GAR *514,316* PC A03/MF A01

N85-12861/9/GAR
Viscous-Inviscid Aerodynamic Analysis of Two-Dimensional Thrust Augmentors.
N85-12861/9/GAR *514,317* PC A03/MF A01

N85-12862/7/GAR
Application of the Onera Model of Dynamic Stall.
N85-12862/7/GAR *514,318* PC A04/MF A01

N85-12863/5/GAR
Natural Laminar Flow Airfoil Design Considerations for Winglets on Low-Speed Airplanes.
N85-12863/5/GAR *514,319* PC A03/MF A01

N85-12864/3/GAR
Local Stability Analysis for a Planar Shock Wave.
N85-12864/3/GAR *515,530* PC A02/MF A01

N85-12865/0/GAR
Study of the Structure of Turbulent Shear Flows at Supersonic Speeds and High Reynolds Number.
N85-12865/0/GAR *515,531* PC A04/MF A01

N85-12866/8/GAR
Development of Computational Fluid Dynamics at NASA Ames Research Center.
N85-12866/8/GAR *514,320* PC A02/MF A01

N85-12867/6/GAR
Space Shuttle Orbiter Trimmed Center-of-Gravity Extension Study. Volume 8: Effects of Configuration Modifications on the Aerodynamic Characteristics of the 140 a/B Orbiter at a Mach Number of 5.97.
N85-12867/6/GAR *515,712* PC A04/MF A01

N85-12868/4/GAR
Comparison of Wortmann Airfoil Computer-Generated Lift and Drag Polars with Flight and Wind Tunnel Results.
N85-12868/4/GAR *514,321* PC A02/MF A01

N85-12870/0/GAR
Role of Freestream Turbulence Scale in Subsonic Flow Separation.
N85-12870/0/GAR *514,322* PC A03/MF A01

N85-12871/8/GAR
Physics on Aircraft Wakes.
N85-12871/8/GAR *514,323* PC A02/MF A01

N85-12872/6/GAR
Etude Par Anemometrie Laser d'Ecoulements Decolles sur des Profils d'Aile (Laser Anemometer Study of Separated Flow on Wing Profiles).
N85-12872/6/GAR *514,324* PC A05/MF A01

N85-12873/4/GAR
Adaptation de Parois a Mach 1.2 (Wall Adaptation at Mach 1.2).
N85-12873/4/GAR *515,213* PC A03/MF A01

N85-12874/2/GAR
Singularitaeten-Modell Zur Analyse der Wandinterferenz in Geschlossenen Windkanalen Nach der Wanddrucksignatur-Methode (Blockierung und Auftrieb) (Singularity Model for the Analysis of Wall Interference in Closed Wind Tunnels According to the Wall Pressure Signature Method (Blockage and Lift)).
N85-12874/2/GAR *515,214* PC A05/MF A01

N85-12875/9/GAR
Wandeinfluss-Korrekturen in Windkanaelen: Blockierungskorrektur Nach der Wandrucksignatur-Methode (Wall Influence Corrections in Wind Tunnels: Blockage Correction According to the Wall Pressure Signature Method).
N85-12875/9/GAR *515,215* PC A04/MF A01

N85-12876/7/GAR
Parametrische Bestimmung der Blockierungsinterferenzen fuer Drei-Dimensionale Modelle im Transonic-Kanal des Eidgenoessisches Flugzwerk, Emmen (Parametric Determination of Blockage Interference of 3-Dimensional Models in the Emmen Federal Aircraft Works Transonic Tunnel (Switzerland)).
N85-12876/7/GAR *515,216* PC A03/MF A01

N85-12877/5/GAR
Grenzschichtuntersuchungen im Transonic-Kanal des Eidgenoessisches Flugzwerke, Emmen (Investigations of Boundary Layers in the Emmen Federal Aircraft Works Transonic Tunnel, Switzerland).
N85-12877/5/GAR *515,217* PC A07/MF A01

N85-12878/3/GAR

Vergleichende Stroemungsrechnung an Transsonischen Kegel/Zylinder-Eidhmodellen im Zusammenhang MIT Dem Wandinterferenzproblem (Comparative Flow Calculation on Transonic Cone/Cylinder Standard Models in Connection with the Wall Interference Problem).
N85-12878/3/GAR *515,218* PC **A07/MF A01**

N85-12879/1/GAR

Local Slot Boundary Condition for Transonic Flow Calculations in Slotted-Wall Test Sections of Wind Tunnels.
N85-12879/1/GAR *515,219* PC **A03/MF A01**

N85-12882/5/GAR

Analise E Simulacao de Um Sistema Inercial (Strapdown) de Determinacao de Atitude Auxiliado Por Estimacao Adaptativa DA Deriva (Analysis and Simulation of an Inertial System (Strapdown) for Auxiliary Attitude Determination by Adaptive Drift Estimation).
N85-12882/5/GAR *515,303* PC **A07/MF A01**

N85-12884/1/GAR

Flight and Wind-Tunnel Comparisons of the Inlet-Airframe Interaction of the F-15 Airplane.
N85-12884/1/GAR *514,334* PC **A03/MF A01**

N85-12885/8/GAR

Realistic Localizer Courses for Aircraft Instrument Landing Simulators.
N85-12885/8/GAR *514,531* PC **A05/MF A01**

N85-12886/6/GAR

Les Materiaux Structuraux Modernes Situation Actuelles et Perspectives d'Evolution (Modern Structural Materials. Present Situation and Evolution Prospects).
N85-12886/6/GAR *514,335* PC **A04/MF A01**

N85-12888/2/GAR

Graphische Software Zur Darstellung der Deformationsbewegung Eines Koerpers (Graphics Software for the Display of Body Deformation Motion).
N85-12888/2/GAR *514,336* PC **A05/MF A01**

N85-12889/0/GAR

System Status Display Information.
N85-12889/0/GAR *514,341* PC **A04/MF A01**

N85-12890/8/GAR

Turbine Blade Damping Study.
N85-12890/8/GAR *515,683* PC **A09/MF A01**

N85-12894/0/GAR

Experimental Investigation of Two-Dimensional Thrust Augmenting Ejectors, Part 1.
N85-12894/0/GAR *515,684* PC **A06/MF A01**

N85-12895/7/GAR

Experimental Investigation of Two-Dimensional Thrust Augmenting Ejectors, Part 2.
N85-12895/7/GAR *515,685* PC **A05/MF A01**

N85-12899/9/GAR

Development and Fabrication of Refractory Bodies for Gas Turbine Engines.
N85-12899/9/GAR *515,686* PC **A04/MF A01**

N85-12900/5/GAR

Flight Tests of the Digital Integrated Automatic Landing System (Dials).
N85-12900/5/GAR *515,304* PC **A07/MF A01**

N85-12901/3/GAR

High-Temperature Optically Activated GaAs Power Switching for Aircraft Digital Electronic Control.
N85-12901/3/GAR *514,337* PC **A10/MF A01**

N85-12903/9/GAR

Preliminary Checkout, Evaluation and Calibration of a 3-Component Force Measurement System for Calibrating Propulsion Simulators for Wind Tunnel Models.
N85-12903/9/GAR *515,220* PC **A09/MF A01**

N85-12904/7/GAR

Untersuchung Zur Verbesserung der Transonic-Kanal-Messstrecke des Eidgenoessisches Flugzwerke, Emmen (Investigation for the Improvement of the Transonic Tunnel Working Section of the Emmen Federal Aircraft Works (Switzerland)).
N85-12904/7/GAR *515,221* PC **A04/MF A01**

N85-12905/4/GAR

Mission Science Value-Cost Savings from the Advanced Imaging Communication System (AICS) (Advanced Imaging Communication System).
N85-12905/4/GAR *515,283* PC **A03/MF A01**

N85-12906/2/GAR

Technologies for Space Station Autonomy.
N85-12906/2/GAR *515,713* PC **A05/MF A01**

N85-12907/0/GAR

Colloquium About Joint Projects within DFVLR/ISRO(Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt/Indian Space Research Organization, Bangalore, Satellite Centre) Cooperation.
N85-12907/0/GAR *515,703* PC **A06/MF A01**

N85-12915/3/GAR

Mars Dust Sample Return Mission.
N85-12915/3/GAR *515,704* PC **A03/MF A01**

N85-12916/1/GAR

Mission Interstellaire (Interstellar Mission).
N85-12916/1/GAR *515,705* PC **A06/MF A01**

N85-12917/9/GAR

Les Systemes de Lancements (Launching Systems).
N85-12917/9/GAR *515,721* PC **A04/MF A01**

N85-12918/7/GAR

Reduction and Analysis of Data from the Plasma Wave Instruments on the IMP-6 and IMP-8 Spacecraft.
N85-12918/7/GAR *514,405* PC **A03/MF A01**

N85-12920/3/GAR

Oil-Flow Study of a Space Shuttle Orbiter Tip-Fin Controller.
N85-12920/3/GAR *515,714* PC **A04/MF A01**

N85-12921/1/GAR

Selected Tether Applications in Space: An Analysis of Five Selected Concepts.
N85-12921/1/GAR *515,706* PC **A10/MF A01**

N85-12922/9/GAR

Definition of Technology Development Missions for Early Space Station Satellite Servicing. Volume 1. Executive Summary.
N85-12922/9/GAR *515,707* PC **A05/MF A01**

N85-12923/7/GAR

Definition of Technology Development Missions for Early Space Station Satellite Servicing. Volume 2. Technical.
N85-12923/7/GAR *515,708* PC **A08/MF A01**

N85-12924/5/GAR

Launch Summary for 1978 - 1982.
N85-12924/5/GAR *515,722* PC **A06/MF A01**

N85-12925/2/GAR

Technologies des Missiles Tactiques: Recherches et Perspectives d'Avenir (Tactical Missiles Technologies. Research and Prospectives).
N85-12925/2/GAR *515,276* PC **A03/MF A01**

N85-12926/0/GAR

Space Know-How, Twenty Years' Space Experience.
N85-12926/0/GAR *515,715* PC **A02/MF A01**

N85-12931/0/GAR

Autonomous Momentum Management for Space Station.
N85-12931/0/GAR *515,716* PC **A04/MF A01**

N85-12932/8/GAR

Conceptual Design for Scaled Truss Antenna Flight Experiment.
N85-12932/8/GAR *515,717* PC **A03/MF A01**

N85-12933/6/GAR

Autonomous Momentum Management for Space Station, Exhibit A.
N85-12933/6/GAR *515,718* PC **A04/MF A01**

N85-12934/4/GAR

Design, Fabrication and Delivery of a Spacelab Neutral Buoyancy Instrument Pointing System (IPS) Mockup.
N85-12934/4/GAR *514,532* PC **A04/MF A01**

N85-12935/1/GAR

Ion Thruster Performance Model.
N85-12935/1/GAR *515,602* PC **A07/MF A01**

N85-12936/9/GAR

Space Power Distribution System Technology. Volume 3. Test Facility Design.
N85-12936/9/GAR *515,719* PC **A05/MF A01**

N85-12937/7/GAR

Ion Thruster System (8-cm) Cyclic Endurance Test.
N85-12937/7/GAR *515,603* PC **A07/MF A01**

N85-12941/9/GAR

Tough Composite Materials.
N85-12941/9/GAR *514,973* PC **A17/MF A01**

N85-12966/6/GAR

Composite Structural Materials.
N85-12966/6/GAR *514,974* PC **A08/MF A01**

N85-12979/9/GAR

Essai 17.208: Statistique sur les Caracteristics de Base des Composites Carbone-Epoxy (Traction) (Test Report No. 17.208: Statistics of the Basic Characteristics of Carbon-Epoxy Composites).
N85-12979/9/GAR *514,975* PC **A04/MF A01**

N85-12980/7/GAR

Influence de la Relaxation sur les Caracteristiques Mecaniques d'UN Composite Carbone Epoxy, Proces-Verbal No. 45.427/1 (Influence of Relaxation on the Mechanical Characteristics of a Carbon-Epoxy Composite. Report No. 45.427/1).
N85-12980/7/GAR *514,976* PC **A02/MF A01**

N85-12981/5/GAR

Assurance Qualite des Materiaux Composites, Proces-Verbal No. 45-649/F (Quality Assurance of Composite Materials, Test Report No. 45-649/F).
N85-12981/5/GAR *514,977* PC **A04/MF A01**

N85-12982/3/GAR

Preparation of Sinter-Active Silicon Carbide Powders.
N85-12982/3/GAR *514,978* PC **A05/MF A01**

N85-13000/3/GAR

Mathematical Models for the Boiling Diagram of the Ideal Two-Component Mixture.
N85-13000/3/GAR *514,701* PC **A03/MF A01**

N85-13001/1/GAR

Development and Testing of Thin Film Cells for High Temperature Water Vapor Electrolysis.
N85-13001/1/GAR *514,702* PC **A05/MF A01**

N85-13002/9/GAR

PRIAMUS: Ein Rechenprogramm zur Bestimmung Thermophysikalischer Stoffwerte von Gasmischungen Aus O2, N2, CO, CO7, He, H2O, H2 und CH4 (PRIAMUS, a Computer Program for the Calculation of Thermophysical Properties of Gas Mixtures Containing O2, N2, CO, CO2, He, H2O, H2, CH4).
N85-13002/9/GAR *514,703* PC **A04/MF A01**

N85-13003/7/GAR

Combustion Waves in Dispersed-2-Phase Mixtures.
N85-13003/7/GAR *514,704* PC **A02/MF A01**

N85-13006/0/GAR

Effect of Humidity on Fretting Wear of Several Pure Metals.
N85-13006/0/GAR *514,992* PC **A02/MF A01**

N85-13007/8/GAR

Stirling Material Technology.
N85-13007/8/GAR *515,692* PC **A02/MF A01**

N85-13008/6/GAR

Structural Changes During Milling of Aluminum Oxide Powders.
N85-13008/6/GAR *514,959* PC **A02/MF A01**

N85-13009/4/GAR

Alpha-Form of the Hydroxides of Bivalent Metals.
N85-13009/4/GAR *514,705* PC **A03/MF A01**

N85-13010/2/GAR

Reactive Sintering of SiC
N85-13010/2/GAR *514,960* PC **A02/MF A01**

N85-13036/7/GAR

Ion Contrasting Chamber for Discrimination of Grains and Textures.
N85-13036/7/GAR *514,993* PC **A03/MF A01**

N85-13037/5/GAR

Corrosions des Laitons de Robinetterie (Corrosion of Brass in Potable Water Service).
N85-13037/5/GAR *514,994* PC **A02/MF A01**

N85-13038/3/GAR

Interactions Between Corrosion and Creep of Uncoated and Coated Superalloys in Sulfate Melts.
N85-13038/3/GAR *514,995* PC **A03/MF A01**

N85-13039/1/GAR

Development of Rapidly Quenched Alloys with Special Physical Properties and of Processes for Their Continuous Production.
N85-13039/1/GAR *514,996* PC **A09/MF A01**

N85-13043/3/GAR

Development of Acceptance Criteria for Batches of Silane Primer for External Tank Thermal Protection System Bonding Applications.
N85-13043/3/GAR *514,681* PC **A05/MF A01**

N85-13044/1/GAR

Effect of Barrier Height on Friction Behavior of the Semiconductors Silicon and Gallium Arsenide in Contact with Pure Metals.
N85-13044/1/GAR *514,791* PC **A02/MF A01**

N85-13045/8/GAR

High-Temperature Erosion of Plasma-Sprayed, Yttria-Stabilized Zirconia in a Simulated Turbine Environment.
N85-13045/8/GAR *514,961* PC **A02/MF A01**

N85-13046/6/GAR

Toughening Mechanism in Elastomer-Modified Epoxy Resins, Part 2.
N85-13046/6/GAR *515,018* PC **A04/MF A01**

N85-13048/2/GAR

Study of the Pore Structure of Ceramics Prepared by the Slip Casting Method.
N85-13048/2/GAR *514,962* PC **A02/MF A01**

N85-13049/0/GAR

Essai 17.202: Caracterisation de Resine Polyimide (Polyimide Resin Characteristics, Test).
N85-13049/0/GAR *514,979* PC **A03/MF A01**

N85-13061/5/GAR

Fluorescent Dyes for Luminescent Solar Concentrators.
N85-13061/5/GAR *514,919* PC **A06/MF A01**

N85-13062/3/GAR

Optimisation de l'Injection des Thermoplastiques Thermostables Peek Renforces de Fibres Courtes de Carbone (Optimization of the Injection Process for Thermostatic Polyether-Ether-Ketone (Peek) Thermoplastics Reinforced with Short Carbon Fibers).
N85-13062/3/GAR *515,013* PC **A02/MF A01**

N85-13066/4/GAR

Liquid Phase Products and Solid Deposit Formation from Thermally Stressed Model Jet Fuels.
N85-13066/4/GAR *515,668* PC **A03/MF A01**

N85-13072/2/GAR

Official Journey to USA, November 1983. Symposium on the Compatibility of Explosives; Mound Laboratory; Naval Surface Weapons Center.
N85-13072/2/GAR *515,500* PC **A03/MF A01**

N85-13073/0/GAR

Method for Evaluating Petrol Products Corrosivity Using Piezoelectric Crystals. Part 2: Instruction Manual.
N85-13073/0/GAR *515,669* PC **A02/MF A01**

N85-13075/5/GAR

Bulletin of the Faculty of Engineering, Hokkaido University, No. 123.
N85-13075/5/GAR *514,446* PC **A05/MF A01**

N85-13085/4/GAR

L'Electroformage du Nickel (Electroforming of Nickel).
N85-13085/4/GAR *515,148* PC **A03/MF A01**

N85-13137/3/GAR

Limitantes DA Equivocacao Em Canais Gaussianos Aditivos (Equivocation Limits in Gaussian Additive Channels).
N85-13137/3/GAR *514,858* PC **A02/MF A01**

NTIS ORDER/REPORT NUMBER INDEX

N85-13138/9/GAR

Fiber Optic Data Bus Using Frequency Division Multiplexing (FDM) (Frequency Division Multiplexing) and an Asymmetric Coupler.
N85-13139/9/GAR *515,284* PC A02/MF A01

N85-13146/4/GAR

Transmission de la Television en Modulation de Frequence (Television Transmission in Frequency Modulation).
N85-13146/4/GAR *515,285* PC A02/MF A01

N85-13147/2/GAR

Systeme de Telecommunications Par Satellite Telecom 1 (The Telecom 1 Satellite Telecommunication System).
N85-13147/2/GAR *515,286* PC A02/MF A01

N85-13148/0/GAR

Methodology for the Implementation of a Domestic Satellite Communications Network.
N85-13148/0/GAR *515,287* PC A03/MF A01

N85-13149/8/GAR

Carrier Acquisition and Tracking by a COSTAS Loop with Automatic Frequency Control.
N85-13149/8/GAR *515,288* PC A04/MF A01

N85-13150/6/GAR

Apollo System Requirements Specification.
N85-13150/6/GAR *515,289* PC A03/MF A01

N85-13151/4/GAR

Transmission Analysis for the Use of 2-4 PSK (Phase Shift Keying) Modulation in Satellite Broadcasting.
N85-13151/4/GAR *515,290* PC A07/MF A01

N85-13152/2/GAR

Digital Radio Link: Wave Propagation Measurements Using Narrow Band Technique.
N85-13152/2/GAR *515,291* PC A03/MF A01

N85-13153/0/GAR

Digital Image Processing: Report from a Conference and Study Trip to the USA and Canada, Summer 1984.
N85-13153/0/GAR *514,821* PC A03/MF A01

N85-13154/8/GAR

Essais de Susceptibilite a Une Agression Electromagnetique (Tests for Susceptibility to Electromagnetic Attack).
N85-13154/8/GAR *515,345* PC A02/MF A01

N85-13155/5/GAR

Implementing Waveguide Bandwidth Six-Port Reflectometer Circuits at Millimetric Wavelengths.
N85-13155/5/GAR *515,222* PC A02/MF A01

N85-13156/3/GAR

Procedures for Precap Visual Inspection.
N85-13156/3/GAR *515,149* PC A05/MF A01

N85-13157/1/GAR

Control Aspects of the Schuchuli Village Stand-Alone Photovoltaic Power System.
N85-13157/1/GAR *514,944* PC A03/MF A01

N85-13166/2/GAR

Les Transistors MOS de Puissance (Metal Oxide Semiconductors Power Translators).
N85-13166/2/GAR *514,792* PC A02/MF A01

N85-13167/0/GAR

Simulation d'Une Chaine de Transmission a Elements Faiblement Non Lineaires. Calculs des Produits d'Intermodulation sur UN Signal Compose de N Porteuses (Simulation of a Transmission Circuit Composed of Slightly Nonlinear Elements. Computation of the Intermodulation on Signals Composed of N Carriers).
N85-13167/0/GAR *514,859* PC A04/MF A01

N85-13168/8/GAR

Conception de Circuits Assistee Par Ordinateur: Realisation de Masques pour l'Elaboration de Circuits Microondes (Computerized Circuit Designs: Realization of Masks to Manufacture Microwave Circuits).
N85-13168/8/GAR *515,150* PC A05/MF A01

N85-13169/6/GAR

Les Composants Electroniques pour Applications Spatiales (Electronic Components for Space Applications).
N85-13169/6/GAR *514,849* PC A05/MF A01

N85-13170/4/GAR

Qualification of a Thick Film Hybrid.
N85-13170/4/GAR *514,864* PC A03/MF A01

N85-13171/2/GAR

Pulse Injection on a Power Cable Penetrating a Shielding Wall by Feed-Through Capacitors.
N85-13171/2/GAR *514,793* PC A03/MF A01

N85-13172/0/GAR

Improvement of Lightning Arresters Energy Capability.
N85-13172/0/GAR *514,794* PC A02/MF A01

N85-13175/3/GAR

Preliminary Study of Numerical Simulation of Thermosolutal Convection of Interest to Crystal Growth.
N85-13175/3/GAR *515,529* PC A03/MF A01

N85-13192/8/GAR

Partikelmitfuehrung in Einem Kompressiblen Wirbel (Particle Entrainment in a Compressible Vortex).
N85-13192/8/GAR *515,532* PC A02/MF A01

N85-13193/6/GAR

Etudes des Correlations Vitesse-Pression Acoustique Conditionnees sur le Signe et l'Amplitude de la Fluctuation de Vitesse dans UN Jet Froid (Study of the Velocity-Acoustic Pressure Correlation in a Cold Jet, Centered on the Sign and the Amplitude of the Velocity Fluctuations).
N85-13193/6/GAR *515,516* PC A03/MF A01

N85-13194/4/GAR

Model Equations Describing Unsteady Fluid Motion.
N85-13194/4/GAR *515,533* PC A03/MF A01

N85-13195/1/GAR

Numerical Calculation of Steady Turbulent Flows in Adverse Pressure Gradients.
N85-13195/1/GAR *515,534* PC A03/MF A01

N85-13196/9/GAR

Progress in the Development of a Two-Fluid Model of Turbulence for Near-Wall Flows, Part 1.
N85-13196/9/GAR *515,535* PC A03/MF A01

N85-13197/7/GAR

Progress in the Development of a Two-Fluid Model of Turbulence for Near-Wall Flows. Part 3: Preliminary Investigation of a Stably-Stratified Boundary Layer.
N85-13197/7/GAR *515,536* PC A02/MF A01

N85-13198/5/GAR

Proposal for Wall Function for Friction and Heat Transfer in the Presence of Roughness and Mass Transfer.
N85-13198/5/GAR *515,537* PC A02/MF A01

N85-13199/3/GAR

Organ-Pipe Oscillation.
N85-13199/3/GAR *515,178* PC A03/MF A01

N85-13200/9/GAR

Laminar Jet Issuing into Stagnant Surroundings.
N85-13200/9/GAR *515,538* PC A03/MF A01

N85-13201/7/GAR

Bruit Robinet/Fluctuations de Pression. Etude du Comportement Acoustique des Equipments Hydrauliques du Batiment en Fonction de la Temperature (Tap Noise-Pressure Fluctuations. Study of the Acoustic Behavior of Hydraulic Equipment in Buildings as a Function of the Temperature).
N85-13201/7/GAR *515,179* PC A08/MF A01

N85-13205/8/GAR

Study of Instrument Design Options for the Columbus Spectroscopy Mission.
N85-13205/8/GAR *515,223* PC A07/MF A01

N85-13215/7/GAR

Development of Components for Micro-C Oriented Sensor Systems.
N85-13215/7/GAR *515,224* PC A09/MF A01

N85-13216/5/GAR

Magnetic Inductive Flowmeter for Low Conducting Liquids.
N85-13216/5/GAR *515,225* PC A04/MF A01

N85-13217/3/GAR

Development of a Feasibility Model for a Thin-Film Precision Power Meter.
N85-13217/3/GAR *515,226* PC A03/MF A01

N85-13218/1/GAR

Instrumented Impact Testing Machine with Reduced Specimen Oscillation Effects.
N85-13218/1/GAR *515,227* PC A03/MF A01

N85-13219/9/GAR

Ion Beam Lithography.
N85-13219/9/GAR *515,151* PC A05/MF A01

N85-13221/5/GAR

Investigation of RF Excited CW CO2 Waveguide Lasers.
N85-13221/5/GAR *515,546* PC A03/MF A01

N85-13230/6/GAR

Laser for Determining the Ignition Conditions of a Pyrotechnic Mixture.
N85-13230/6/GAR *515,598* PC A03/MF A01

N85-13231/4/GAR

Focusing Effects of a Laser Beam in the Nonresonant Multiphoton Ionization MPI(Multiphoton Ionization) of Gases.
N85-13231/4/GAR *515,573* PC A03/MF A01

N85-13232/2/GAR

Improved Sensitivities in Laser Interferometers for the Detection of Gravitational Waves.
N85-13232/2/GAR *515,574* PC A02/MF A01

N85-13233/0/GAR

Effect of Two Inner-Ring Oil-Flow Distribution Schemes on the Operating Characteristics of a 35 Millimeter Bore Ball Bearing to 2.5 Million Dn.
N85-13233/0/GAR *515,165* PC A02/MF A01

N85-13234/8/GAR

Effect of Lubricant Extreme-Pressure Additives on Surface Fatigue Life of AISI 9310 Spur Gears.
N85-13234/8/GAR *515,166* PC A02/MF A01

N85-13235/5/GAR

Advanced Automotive Diesel Assessment Program.
N85-13235/5/GAR *515,693* PC A16/MF A01

N85-13245/4/GAR

Evaluation of Heat Engine for Hybrid Vehicle Application.
N85-13245/4/GAR *515,604* PC A04/MF A01

N85-13252/0/GAR

Conduite d'Une Cellule Flexible d'Usinage (Design of a Flexible Machining System).
N85-13252/0/GAR *515,152* PC A07/MF A01

N85-13253/8/GAR

Surveillance des Machines (The Monitoring of Machines).
N85-13253/8/GAR *315,167* PC A03/MF A01

N85-13257/9/GAR

L'Organisation de la Qualite (Quality Organization).
N85-13257/9/GAR *515,255* PC A07/MF A01

N85-13258/7/GAR

Fiabilite Composants et Technologies d'Assemblage (Component Reliability and Assembling Technologies).
N85-13258/7/GAR *515,153* PC A04/MF A01

N85-13259/5/GAR

ESA(European Space Agency) Product Assurance Specification System: Explanatory Note.
N85-13259/5/GAR *515,720* PC A02/MF A01

N85-13260/3/GAR

Seuil de Detectabilite des Defauts dans les Assemblages Rives, Proces-Verbal No.44-833/F (Defect Detection Threshold in Riveted Joints, Test Report No.44-833/F).
N85-13260/3/GAR *515,256* PC A09/MF A01

N85-13264/5/GAR

Nondestructive Evaluation of Residual Stress in Low-Carbon Steel.
N85-13264/5/GAR *514,997* PC A03/MF A01

N85-13267/8/GAR

Full-Scale Crash-Test Evaluation of Two Load-Limiting Subfloors for General Aviation Airframes.
N85-13267/8/GAR *514,338* PC A04/MF A01

N85-13268/6/GAR

Buckling Analysis for Rectangular Orthotropic Plates with Centrally Located Cutouts.
N85-13268/6/GAR *515,578* PC A03/MF A01

N85-13269/4/GAR

Flutter Parametric Studies of Cantilevered Twin-Engine-Transport Type Wing with and Without Winglet. Volume 1: Low-Speed Investigations.
N85-13269/4/GAR *514,339* PC A05/MF A01

N85-13270/2/GAR

Flutter Parametric Studies of Cantilevered Twin-Engine Transport Type Wing with and Without Winglet. Volume 2: Transonic and Density Effect Investigations.
N85-13270/2/GAR *514,340* PC A07/MF A01

N85-13279/3/GAR

Stress Intensity Factors for Corner Cracks at Holes Located Near an Edge.
N85-13279/3/GAR *515,579* PC A07/MF A01

N85-13280/1/GAR

Formulations et Methodes de Resolution des Problemes Classiques du Flambage Statique (Formulation and Solution Methods for Classical Problems of Static Buckling).
N85-13280/1/GAR *515,580* PC A04/MF A01

N85-13281/9/GAR

Deformations Non-Lineaires et Flambage Statique Lineaire de Structures Soumises a des Forces de Pression (Nonlinear Deformation and Static Linear Buckling of Structures under Pressure).
N85-13281/9/GAR *515,581* PC A03/MF A01

N85-13282/7/GAR

Methode d'Essais de Telecabines (Test Methods for Cable Cars).
N85-13282/7/GAR *515,228* PC A02/MF A01

N85-13308/0/GAR

Contribuciones Cientificas Para Conmemorar El 75 Aniversario Del Observatorio Del Ebro (Scientific Contributions in Commemoration of Ebro Observatory's 75TH Anniversary).
N85-13308/0/GAR *514,406* PC A23/MF A01

N85-13356/9/GAR

LANDSAT Instruments Characterization.
N85-13356/9/GAR *514,822* PC A02/MF A01

N85-13357/7/GAR

Investigation of Several Aspects of LANDSAT 4/5 Data Quality.
N85-13357/7/GAR *514,823* PC A02/MF A01

N85-13358/5/GAR

Ice-Soil Mixtures: Visual and Near-Infrared Remote Sensing Techniques.
N85-13358/5/GAR *514,775* PC A02/MF A01

N85-13359/3/GAR

Relatorio Do Trabalho de Campo Realizado NAS Bacias DOS Rios Quebra Osso E Tanque Preto, NA Quadricula de Catas Altas, Minas Gerais (Report of the Field Work Performed in the Basins of the Quebra Osso and Tanque Petro Rivers in the Catas Altas Quadrangle, Minas Gerais).
N85-13359/3/GAR *514,745* PC A04/MF A01

N85-13361/9/GAR

Scattering Models in the Microwave Regime.
N85-13361/9/GAR *515,591* PC A04/MF A01

N85-13365/0/GAR

Lithospheric Structure in the Pacific Geoid.
N85-13365/0/GAR *514,739* PC A02/MF A01

N85-13371/8/GAR

Regenerative Fuel Cell Energy Storage System for a Low Earth Orbit Space Station.
N85-13371/8/GAR *514,945* PC A07/MF A01

N85-13372/6/GAR

International Test and Demonstration of a 1-Mw Wellhead Generator: Helical Screw Expander Power Plant.
N85-13372/6/GAR *514,946* PC A11/MF A01

N85-13375/9/GAR

Concentrator Optical Characterization Using Computer Mathematical Modelling and Point Source Testing.
N85-13375/9/GAR *514,920* PC A03/MF A01

N85-13376/7/GAR

Software Used with the Flux Mapper at the Solar Parabolic Dish Test Site.
N85-13376/7/GAR *514,921* PC A04/MF A01

N85-13406/2/GAR

Petrologic Model of the Northern Mississippi Embayment Based on Satellite Magnetic and Ground Based Geophysical Data.
N85-13406/2/GAR *514,746* PC A02/MF A01

N85-13407/0/GAR

Particle Velocity Experiments in Anorthosite and Gabbro.
N85-13407/0/GAR *514,747* PC A02/MF A01

N85-13408/8/GAR

Archean Sedimentation and Tectonics in Southern Africa.
N85-13408/8/GAR *514,748* PC A02/MF A01

N85-13409/6/GAR

Global Matrix of Thermospheric Density Values for Selected Solar/Geomagnetic Conditions and Spacecraft Orbital Attitudes.
N85-13409/6/GAR *514,407* PC A05/MF A01

N85-13421/1/GAR

Fontes de Calor Nos Tropicos E Escoamentos Anoma Los de Larga Escala Associadas COM Anomalias de Precipitacao No Nordeste Do Brasil (Heat Sources in the Tropics and Large Scale Flow Anomalies Associated with Precipitation Anomalies in Northeast Brazil).
N85-13421/1/GAR *514,414* PC A05/MF A01

N85-13422/9/GAR

Alternative to Reduction of Surface Pressure to Sea Level.
N85-13422/9/GAR *514,415* PC A02/MF A01

N85-13424/5/GAR

Investigations of Severe/Tornadic Thunderstorm Development and Evolution Based on Satellite and AVE/Sesame/VAS Data.
N85-13424/5/GAR *514,416* PC A02/MF A01

N85-13434/4/GAR

Inzameling en Opslag van Cabauwmetingen: Een Systeemvoorstel (Acquisition and Storage of Cabauw Measurements: A System Proposal).
N85-13434/4/GAR *514,417* PC A04/MF A01

N85-13435/1/GAR

Operationele Numerieke Voorspellingen: Overzicht en Verifikatie over de Periode 1978-1983 (Operational Numerical Forecasts: Survey and Verification over the Period 1978-1983).
N85-13435/1/GAR *514,418* PC A03/MF A01

N85-13445/0/GAR

Ocean Services User Needs Assessment. Volume 1. Survey Results, Conclusions and Recommendations.
N85-13445/0/GAR *514,447* PC A07/MF A01

N85-13446/8/GAR

Multisensor Satellite Data Integration for Sea Surface Wind Speed and Direction Determination.
N85-13446/8/GAR *514,770* PC A05/MF A01

N85-13447/6/GAR

Coastal Zone Color Scanner (CZCS): Imagery of Near-Surface Phytoplankton Pigment Concentrations from the First Coastal Ocean Dynamics Experiment (CODE-1), March - July 1981.
N85-13447/6/GAR *514,733* PC A05/MF A01

N85-13448/4/GAR

Dynamics of Coupled Ice-Ocean System in the Marginal Ice Zone: Study of the Mesoscale Processes and of Constitutive Equations for Sea Ice.
N85-13448/4/GAR *514,776* PC A06/MF A01

N85-13467/4/GAR

Aerospace Medicine and Biology, a Continuing Bibliography with Indexes.
N85-13467/4/GAR *514,585* PC$7.00

N85-13468/2/GAR

Modulation of the Cytosolic Androgen Receptor in Striated Muscle by Sex Steroids.
N85-13468/2/GAR *514,642* PC A02/MF A01

N85-13469/0/GAR

Space Medicine Research Publications: 1983-1984.
N85-13469/0/GAR *514,586* PC A04/MF A01

N85-13471/6/GAR

Experiments with Hydrox at 1.3 Mpa (13 ATM).
N85-13471/6/GAR *514,822* PC A07/MF A01

N85-13473/2/GAR

Human Role in Space. Volume 1. Executive Summary.
N85-13473/2/GAR *515,709* PC A03/MF A01

N85-13474/0/GAR

Human Role in Space. Volume 2. Research Analysis and Technology Report.
N85-13474/0/GAR *515,710* PC A14/MF A01

N85-13475/7/GAR

Human Role in Space. Volume 3: Generalizations on Human Roles in Space.
N85-13475/7/GAR *515,711* PC A04/MF A01

N85-13477/3/GAR

Analysis of the Impact of Error Detection on Computer Performance.
N85-13477/3/GAR *514,824* PC A02/MF A01

N85-13478/1/GAR

Unified Method for Evaluating Real-Time Computer Controllers: A Case Study.
N85-13478/1/GAR *514,342* PC A03/MF A01

N85-13491/4/GAR

Documentation for the Machine-Readable Version of the MK Classification Extension Catalogue Morris-Kennedy (1983).
N85-13491/4/GAR *514,382* PC A02/MF A01

N85-13492/2/GAR

Documentation for the Machine-Readable Version of the Perth 75: A Catalogue of Positions of 2589 FK4 and Fk4s Stars (Nikoloff and Hog 1982).
N85-13492/2/GAR *514,383* PC A02/MF A01

N85-13493/0/GAR

Documentation for the Machine-Readable Version of the AGK3 Star Catalogue of Positions and Proper Motions North of -2 Deg .5 Declination (Dieckvoss and Collaborators 1975).
N85-13493/0/GAR *514,384* PC A02/MF A01

N85-13503/6/GAR

Entwurf und Implementierung Eines Modularen Programmsystems Zur Durchfuehrung Statistischer Analysen (Design and Implementation of a Modular Program System for Statistical Analyses).
N85-13503/6/GAR *514,825* PC A09/MF A01

N85-13504/4/GAR

Formats for Numerical and Textual Data in Data Processing.
N85-13504/4/GAR *514,826* PC A04/MF A01

N85-13514/3/GAR

Test Experience on an Ultrareliable Computer Communication Network.
N85-13514/3/GAR *514,827* PC A02/MF A01

N85-13516/8/GAR

Evaluation of Automated Decisionmaking Methodologies and Development of an Integrated Robotic System Simulation.
N85-13516/8/GAR *514,828* PC A08/MF A01

N85-13520/0/GAR

Self-Tuning Control of Offset: A Unified Approach.
N85-13520/0/GAR *515,038* PC A03/MF A01

N85-13521/8/GAR

Long-Range Predictive Control Using Weighting-Sequence Models.
N85-13521/8/GAR *515,039* PC A03/MF A01

N85-13525/9/GAR

Inducao de Regras de Decisao Nebulosas (Induction of Fuzzy Decision Rules).
N85-13525/9/GAR *515,053* PC A02/MF A01

N85-13526/7/GAR

Noise Removal in Multichannel Images.
N85-13526/7/GAR *514,829* PC A02/MF A01

N85-13527/5/GAR

Restoration of Multichannel Microwave Radiometric Images.
N85-13527/5/GAR *514,830* PC A03/MF A01

N85-13528/3/GAR

Generalized Formulation of TVD (Total Variation Diminution) Lax-Wendroff Schemes.
N85-13528/3/GAR *515,040* PC A02/MF A01

N85-13529/1/GAR

Transformation of Two and Three-Dimensional Regions by Elliptic Systems.
N85-13529/1/GAR *515,041* PC A02/MF A01

N85-13535/8/GAR

Undetected Error Probability for Shortened Hamming Codes.
N85-13535/8/GAR *514,860* PC A02/MF A01

N85-13536/6/GAR

Interval Mathematics Reports.
N85-13536/6/GAR *515,042* PC A05/MF A01

N85-13540/8/GAR

Unrestricted Convergence for Generalized Poisson Integrals.
N85-13540/8/GAR *515,043* PC A02/MF A01

N85-13541/6/GAR

Measure Determining Classes of Balls in Banach Space.
N85-13541/6/GAR *515,044* PC A02/MF A01

N85-13542/4/GAR

Interpolating Sequences for H to Infinity in the Ball.
N85-13542/4/GAR *515,045* PC A02/MF A01

N85-13543/2/GAR

Time Discretization of Parabolic Problems by the Discontinuous Galerkin Method.
N85-13543/2/GAR *515,046* PC A03/MF A01

N85-13544/0/GAR

Loeb Sobolev Spaces with Applications to Variational Integrals and Differential Equations.
N85-13544/0/GAR *515,047* PC A03/MF A01

N85-13549/9/GAR

Experimental Investigation of Shock-Cell Noise Reduction for Dual-Stream Nozzles in Simulated Flight.
N85-13549/9/GAR *515,687* PC A09/MF A01

N85-13550/7/GAR

Experimental Investigation of Shock-Cell Noise Reduction for Single Stream Nozzles in Simulated Flight.
N85-13550/7/GAR *515,688* PC A17/MF A01

H85-13551/5/GAR

Static Jet Noise Test Results of Four 0.35 Scale-Model QCGAT(Quiet Clean General Aviation Turbofan) Mixer Nozzles.
N85-13551/5/GAR *515,689* PC A03/MF A01

N85-13552/3/GAR

Response Measurements for Two Building Structures Excited by Noise from a Large Horizontal Axis Wind Turbine Generator.
N85-13552/3/GAR *515,191* PC A02/MF A01

N85-13553/1/GAR

Evaluation of the Langley 4- by 7-Meter Tunnel for Propeller Noise Measurements.
N85-13553/1/GAR *515,229* PC A03/MF A01

N85-13555/6/GAR

Qualificazione di Sistemi Non-Invasivi Per la Rivelazione on-Line di Perdite in Preriscaldatori d'Acqua Alimento AD Alta Pressione (Qualification of Noninvasive Systems for on-Line Leak Detection in High Pressure Feed Water Preheaters).
N85-13555/6/GAR *515,230* PC A03/MF A01

N85-13556/4/GAR

Mesure des Precharges de Serrage dans les Assemblages Boulonnes Par Methode Ultrasonore (Measurement of the Preloading of Bolted Joints by the Ultrasonic Method).
N85-13556/4/GAR *515,231* PC A12/MF A01

N85-13557/2/GAR

Bruit des Petits Groupes Moto-Compresseurs Mobiles. Experimentation de Plusieurs Traitements Acoustiques de Cout Limite et Permettant des Gains Progressifs (Noise in Small Portable Motocompressors. Experiments on Limited-Cost Acoustic Treatments to Obtain Progressive Improvements).
N85-13557/2/GAR *515,694* PC A04/MF A01

N85-13558/0/GAR

Oscillator Strengths for OII Ions.
N85-13558/0/GAR *514,706* PC A02/MF A01

N85-13559/8/GAR

Velocity-Changing Collisional Effects in Nonlinear Atomic Spectroscopy and Photon Echo Decay in Gases.
N85-13559/8/GAR *514,707* PC A02/MF A01

N85-13560/6/GAR

Scintillator-Fiber Charged Particle Track-Imaging Detector.
N85-13560/6/GAR *515,360* PC A03/MF A01

N85-13588/7/GAR

Energieuebertraege bei Atom-Molekuel-Streuexperimenten AM Beispiel der Systeme SF6-AR, CF4-Ne und Xe-CO2 im I 1 Ev-Bereich (Energy Transfer in Atom-Molecule Scattering Experiments in the 1EV Region with SF6-AR, CF4-Ne and Xe-CO2 Systems as Examples).
N85-13588/7/GAR *514,708* PC A06/MF A01

N85-13589/5/GAR

Untersuchung der K Wechselwirkung bei Stossenergien Zwiachen 0.5 und 5.7 Ev (Investigation on K (4 2P3/2) Hg Interaction at Collision Energies from 0.5 to 5.7 Ev).
N85-13589/5/GAR *514,709* PC A02/MF A01

N85-13590/3/GAR

Rotationsinelastic Streuung von He-Atoms an HF-, HCl-, CF4-, SF6-, C2H6- und C2F6-Molekuelen (Rotational Inelastic Scattering of He-Atoms at HF-, HCl-, CF4-, SF6-, C2H6- and C2F6-Molecules).
N85-13590/3/GAR *514,710* PC A10/MF A01

N85-13594/5/GAR

Fiber Optic, Fabry-Perot High Temperature Sensor.
N85-13594/5/GAR *515,232* PC A03/MF A01

N85-13652/1/GAR

Investigation and Development of Multicolored Liquid Crystal Display Systems for Automotive Dashboard Application and Large Format Information Boards.
N85-13652/1/GAR *515,128* PC A05/MF A01

N85-13659/6/GAR

Experimentelle Zustandsgleichung fuer Bosonenga (Experimental Equations of State for Boson Gases).
N85-13659/6/GAR *515,588* PC A02/MF A01

N85-13662/0/GAR

NASA/ASEE Summer Faculty Fellowship Program, 1984.
N85-13662/0/GAR *514,430* PC A04/MF A01

N85-13663/8/GAR

NASA/ASEE Summer Faculty Fellowship Program, 1984.
N85-13663/8/GAR *514,390* PC A05/MF A01

N85-13664/6/GAR

ASEE-NASA Summer Faculty Fellowship Program (Aeronautics and Research), 1984.
N85-13664/6/GAR *514,431* PC A04/MF A01

N85-13665/3/GAR

Selecao de Projetos de p and D COM Retornos Nao-Numericos (R and D Project Selection with Nonnumerical Returns).
N85-13665/3/GAR *515,054* PC A02/MF A01

N85-13666/1/GAR

Project Resources Planning and Control.
N85-13666/1/GAR *514,539* PC A07/MF A01

N85-13667/9/GAR

Forschungsbericht 1979-1982. Teil 2: Projektteil (Research Report 1979-1982. Part 2: Projects).
N85-13667/9/GAR *514,534* PC A24/MF A01

N85-13668/7/GAR

Dynamic Decision Making.
N85-13668/7/GAR *515,055* PC A03/MF A01

N85-13670/3/GAR

Fy 1984 Scientific and Technical Reports, Articles, Papers and Presentations.
N85-13670/3/GAR *514,448* PC A04/MF A01

N85-13681/0/GAR

Activities Report in Technology.
N85-13681/0/GAR *514,432* PC A03/MF A01

NTIS ORDER/REPORT NUMBER INDEX

N85-13682/8/GAR
Premiers Essais Cryogeniques du Profil Cast 7 a la Soufflerie T2. Comparaisons Avec les Calculs (First Cryogenic Test of the Cast 7 Profile in the T2 Wind Tunnel. Comparison with Calculations).
N85-13682/8/GAR *514,325* PC A04/MF A01

N85-13683/6/GAR
Un Systeme de Documentation Electronique (An Electronic Documentation System).
N85-13683/6/GAR *514,449* PC A02/MF A01

N85-13684/4/GAR
L'Analyse de la Valeur (Value Analysis).
N85-13684/4/GAR *514,483* PC A06/MF A01

N85-13689/3/GAR
International Comparative Study of Systems for the Government Advancement of Research and Development.
N85-13689/3/GAR *514,500* PC A13/MF A01

N85-13692/7/GAR
Overview of Waste Heat Utilization Systems.
N85-13692/7/GAR *514,922* PC A02/MF A01

N85-13694/3/GAR
Activities at the Lunar and Planetary Institute.
N85-13694/3/GAR *514,386* PC A05/MF A01

N85-13699/2/GAR
Normal Incidence, High Resolution X-Ray Telescope for Solar Coronal Observations.
N85-13699/2/GAR *514,387* PC A06/MF A01

N85-13700/8/GAR
Detection of Submillimeter Polarization in the Orion Nebula.
N85-13700/8/GAR *514,388* PC A02/MF A01

N85-13701/6/GAR
Far-Infrared Photometry of Compact Extragalactic Sources: OJ 187 and BL Lac.
N85-13701/6/GAR *514,389* PC A02/MF A01

N85-13702/4/GAR
Far-Infrared Line Emission from the Galaxy.
N85-13702/4/GAR *514,390* PC A10/MF A01

N85-13703/2/GAR
Outer Atmospheres of Giant and Supergiant Stars.
N85-13703/2/GAR *514,391* PC A02/MF A01

N85-13704/0/GAR
RS CV sub n Binary Systems.
N85-13704/0/GAR *514,392* PC A02/MF A01

N85-13705/7/GAR
Absolute Transition Probabilities of Lines in the Spectra of Astrophysical Atoms, Molecules, and Ions.
N85-13705/7/GAR *514,393* PC A02/MF A01

N85-13707/3/GAR
Search for the Radiative Decay of a Cosmic Relic Particle with IUE.
N85-13707/3/GAR *514,394* PC A02/MF A01

N85-13708/1/GAR
Mars Polar Volatiles: Topographic and Geologic Setting.
N85-13708/1/GAR *514,395* PC A02/MF A01

N85-13709/9/GAR
Conference on the Origin of the Moon.
N85-13709/9/GAR *514,396* PC A04/MF A01

N85-13758/6/GAR
Laboratory Studies of Atomic Collision Processes of Importance in Planetary Atmospheres.
N85-13758/6/GAR *514,397* PC A03/MF A01

N85-13759/4/GAR
Outer Satellite Atmospheres: Their Nature and Planetary Interactions.
N85-13759/4/GAR *514,398* PC A04/MF A01

N85-13760/2/GAR
Magnetohydrodynamic and Gasdynamic Theories for Planetary Bow Waves.
N85-13760/2/GAR *514,399* PC A04/MF A01

N85-13761/0/GAR
Interplanetary Radio Storms. 2: Emission Levels and Solar Wind Speed in the Range 0.05-0.8 AU.
N85-13761/0/GAR *514,400* PC A03/MF A01

N85-13762/8/GAR
Time Dependent Effects at the Foot of the Chromosphere.
N85-13762/8/GAR *514,401* PC A02/MF A01

N85-13765/1/GAR
Research and Technology, 1984: Marshall Space Flight Center.
N85-13765/1/GAR *514,433* PC A07/MF A01

N-1547-AID
Children and Women in Traditional and Cash Crop Agriculture: A Preliminary Cross-Section Study of Economic Development in Guatemala,
PB85-143709/GAR *514,355* PC A03/MF A01

N-2131-NSF
Scientific and Technical Information Transfer: Issues and Options,
PB85-150357/GAR *514,437* PC A05/MF A01

NAS 1.15:72881-V-8
Space Shuttle Orbiter Trimmed Center-of-Gravity Extension Study. Volume 8: Effects of Configuration Modifications on the Aerodynamic Characteristics of the 140 a/B Orbiter at a Mach Number of 5.97.
N85-12867/6/GAR *515,712* PC A04/MF A01

NAS 1.15:77488
Structural Changes During Milling of Aluminum Oxide Powders.
N85-13008/6/GAR *514,959* PC A02/MF A01

NAS 1.15:77495
Study of the Pore Structure of Ceramics Prepared by the Slip Casting Method.
N85-13048/2/GAR *514,962* PC A02/MF A01

NAS 1.15:77506
Alpha-Form of the Hydroxides of Bivalent Metals.
N85-13009/4/GAR *514,705* PC A03/MF A01

NAS 1.15:77589
International Comparative Study of Systems for the Government Advancement of Research and Development.
N85-13689/3/GAR *514,500* PC A13/MF A01

NAS 1.15:83790
Control Aspects of the Schuchuli Village Stand-Alone Photovoltaic Power System.
N85-13157/1/GAR *514,944* PC A03/MF A01

NAS 1.15:84946
Interplanetary Radio Storms. 2: Emission Levels and Solar Wind Speed in the Range 0.05-0.8 AU.
N85-13761/0/GAR *514,400* PC A03/MF A01

NAS 1.15:85075
Petrologic Model of the Northern Mississippi Embayment Based on Satellite Magnetic and Ground Based Geophysical Data.
N85-13408/2/GAR *514,746* PC A02/MF A01

NAS 1.15:85721
Evaluation of the Langley 4- by 7-Meter Tunnel for Propeller Noise Measurements.
N85-13553/1/GAR *515,229* PC A03/MF A01

NAS 1.15:85804
Conceptual Design for Scaled Truss Antenna Flight Experiment.
N85-12932/8/GAR *515,717* PC A03/MF A01

NAS 1.15:85915
Test Experience on an Ultrareliable Computer Communication Network.
N85-13514/3/GAR *514,827* PC A02/MF A01

NAS 1.15:86013
Detection of Submillimeter Polarization in the Orion Nebula.
N85-13700/8/GAR *514,388* PC A02/MF A01

NAS 1.15:86015
Fiber Optic Data Bus Using Frequency Division Multiplexing (FDM) (Frequency Division Multiplexing) and an Asymmetric Coupler.
N85-13139/9/GAR *515,284* PC A02/MF A01

NAS 1.15:86021
Development of Computational Fluid Dynamics at NASA Ames Research Center.
N85-12866/8/GAR *514,320* PC A02/MF A01

NAS 1.15:86022
Far-Infrared Photometry of Compact Extragalactic Sources: OJ 187 and BL Lac.
N85-13701/6/GAR *514,389* PC A02/MF A01

NAS 1.15:86035
Comparison of Wortmann Airfoil Computer-Generated Lift and Drag Polars with Flight and Wind Tunnel Results.
N85-12868/4/GAR *514,321* PC A02/MF A01

NAS 1.15:86263
Buckling Analysis for Rectangular Orthotropic Plates with Centrally Located Cutouts.
N85-13268/6/GAR *515,578* PC A03/MF A01

NAS 1.15:86278
Oil-Flow Study of a Space Shuttle Orbiter Tip-Fin Controller.
N85-12920/3/GAR *515,714* PC A04/MF A01

NAS 1.15:86339
Project Resources Planning and Control.
N85-13666/1/GAR *514,533* PC A07/MF A01

NAS 1.15:86470
Fy 1984 Scientific and Technical Reports, Articles, Papers and Presentations.
N85-13670/3/GAR *514,448* PC A04/MF A01

NAS 1.15:86476
Research and Technology, 1984: Marshall Space Flight Center.
N85-13765/1/GAR *514,433* PC A07/MF A01

NAS 1.15:86478
Global Matrix of Thermospheric Density Values for Selected Solar/Geomagnetic Conditions and Spacecraft Orbital Attitudes.
N85-13409/6/GAR *514,407* PC A05/MF A01

NAS 1.15:86871
Static Jet Noise Test Results of Four 0.35 Scale-Model QCGAT(Quiet Clean General Aviation Turbofan) Mixer Nozzles.
N85-13551/5/GAR *515,689* PC A03/MF A01

NAS 1.15:86874
Liquid Phase Products and Solid Deposit Formation from Thermally Stressed Model Jet Fuels.
N85-13066/4/GAR *515,668* PC A03/MF A01

NAS 1.15:86888
Stirling Material Technology.
N85-13007/8/GAR *515,692* PC A02/MF A01

NAS 1.15:86901
Overview of Waste Heat Utilization Systems.
N85-13692/7/GAR *514,922* PC A02/MF A01

NAS 1.15:87372
Documentation for the Machine-Readable Version of the MK Classification Extension Catalogue Morris-Kennedy (1983).
N85-13491/4/GAR *514,382* PC A02/MF A01

NAS 1.15:87375
Launch Summary for 1978 - 1982.
N85-12924/5/GAR *515,722* PC A06/MF A01

NAS 1.15:87376
Documentation for the Machine-Readable Version of the Perth 75: A Catalogue of Positions of 2589 FK4 and Fk4s Stars (Nikoloff and Hog 1962).
N85-13492/2/GAR *514,383* PC A02/MF A01

NAS 1.15:87378
Documentation for the Machine-Readable Version of the AGK3 Star Catalogue of Positions and Proper Motions North of -2 Deg .5 Declination (Dieckvoss and Collaborators 1975).
N85-13493/0/GAR *514,384* PC A02/MF A01

NAS 1.15:87392
NASA/ASEE Summer Faculty Fellowship Program, 1984.
N85-13662/0/GAR *514,430* PC A04/MF A01

NAS 1.15:87393
ASEE-NASA Summer Faculty Fellowship Program (Aeronautics and Research), 1984.
N85-13664/6/GAR *514,431* PC A04/MF A01

NAS 1.21:7011(265)
Aerospace Medicine and Biology, a Continuing Bibliography with Indexes.
N85-13467/4/GAR *514,585* PC$7.00

NAS 1.21:7037(180)
Aeronautical Engineering, a Continuing Bibliography with Indexes.
N85-12858/5/GAR *514,315* PC$6.00

NAS 1.26:3845
Experimental Investigation of Shock-Cell Noise Reduction for Single Stream Nozzles in Simulated Flight.
N85-13550/7/GAR *515,688* PC A17/MF A01

NAS 1.26:3846
Experimental Investigation of Shock-Cell Noise Reduction for Dual-Stream Nozzles in Simulated Flight.
N85-13549/9/GAR *515,687* PC A09/MF A01

NAS 1.26:3852
Toughening Mechanism in Elastomer-Modified Epoxy Resins, Part 2.
N85-13046/6/GAR *515,018* PC A04/MF A01

NAS 1.26:3853
Natural Laminar Flow Airfoil Design Considerations for Winglets on Low-Speed Airplanes.
N85-12863/5/GAR *514,319* PC A03/MF A01

NAS 1.26:3859
Flight Tests of the Digital Integrated Automatic Landing System (Dials).
N85-12900/5/GAR *515,304* PC A07/MF A01

NAS 1.26:3860
Space Medicine Research Publications: 1983-1984.
N85-13469/0/GAR *514,586* PC A04/MF A01

NAS 1.26:166810
Study of Flow Past an Airfoil with a Jet Issuing from Its Lower Surface.
N85-12860/1/GAR *514,316* PC A03/MF A01

NAS 1.26:168265
Advanced Automotive Diesel Assessment Program.
N85-13235/5/GAR *515,693* PC A16/MF A01

NAS 1.26:171222
Selected Tether Applications in Space: An Analysis of Five Selected Concepts.
N85-12921/1/GAR *515,706* PC A10/MF A01

NAS 1.26:171223
Human Role in Space. Volume 1. Executive Summary.
N85-13473/2/GAR *515,709* PC A03/MF A01

NAS 1.26:171224
Human Role in Space. Volume 2. Research Analysis and Technology Report.
N85-13474/0/GAR *515,710* PC A14/MF A01

NAS 1.26:171225
Human Role in Space. Volume 3: Generalizations on Human Roles in Space.
N85-13475/7/GAR *515,711* PC A04/MF A01

NAS 1.26:171226
Definition of Technology Development Missions for Early Space Station Satellite Servicing. Volume 1. Executive Summary.
N85-12922/9/GAR *515,707* PC A05/MF A01

NAS 1.26:171229
Definition of Technology Development Missions for Early Space Station Satellite Servicing. Volume 2. Technical.
N85-12923/7/GAR *515,708* PC A08/MF A01

NAS 1.26:171230
Space Power Distribution System Technology. Volume 3. Test Facility Design.
N85-12936/9/GAR *515,719* PC A05/MF A01

NAS 1.26:171233
Design, Fabrication and Delivery of a Spacelab Neutral Buoyancy Instrument Pointing System (IPS) Mockup.
N85-12934/4/GAR *514,532* PC A04/MF A01

NAS 1.26:171247
Analysis of Physical-Chemical Processes Governing SSME Internal Fluid Flows.
N85-12859/3/GAR *515,696* PC A02/MF A01

NAS 1.26:171255
Turbine Blade Damping Study.
N85-12890/8/GAR *515,683* PC A09/MF A01

NAS 1.26:171256
Autonomous Momentum Management for Space Station, Exhibit A.
N85-12933/6/GAR *515,718* PC A04/MF A01

NAS 1.26:171266
Development of Acceptance Criteria for Batches of Silane Primer for External Tank Thermal Protection System Bonding Applications.
N85-13043/3/GAR *514,681* PC A05/MF A01

NAS 1.26:172333
Realistic Localizer Courses for Aircraft Instrument Landing Simulators.
N85-12885/8/GAR *514,531* PC A05/MF A01

NAS 1.26:172347
System Status Display Information.
N85-12889/0/GAR *514,341* PC A04/MF A01

NAS 1.26:172401
Evaluation of Automated Decisionmaking Methodologies and Development of an Integrated Robotic System Simulation.
N85-13516/8/GAR *514,828* PC A08/MF A01

NAS 1.26:172410-V-1
Flutter Parametric Studies of Cantilevered Twin-Engine-Transport Type Wing with and Without Winglet. Volume 1: Low-Speed Investigations.
N85-13269/4/GAR *514,339* PC A05/MF A01

NAS 1.26:172410-V-2
Flutter Parametric Studies of Cantilevered Twin-Engine Transport Type Wing with and Without Winglet. Volume 2: Transonic and Density Effect Investigations.
N85-13270/2/GAR *514,340* PC A07/MF A01

NAS 1.26:172478
Generalized Formulation of TVD (Total Variation Diminution) Lax-Wendroff Schemes.
N85-13528/3/GAR *515,040* PC A02/MF A01

NAS 1.26:172482
Response Measurements for Two Building Structures Excited by Noise from a Large Horizontal Axis Wind Turbine Generator.
N85-13552/3/GAR *515,191* PC A02/MF A01

NAS 1.26:174001
Scattering Models in the Microwave Regime.
N85-13361/9/GAR *515,591* PC A04/MF A01

NAS 1.26:174065
Autonomous Momentum Management for Space Station.
N85-12931/0/GAR *515,716* PC A04/MF A01

NAS 1.26:174068
Conference on the Origin of the Moon.
N85-13709/9/GAR *514,396* PC A04/MF A01

NAS 1.26:174069
Activities at the Lunar and Planetary Institute.
N85-13694/3/GAR *514,386* PC A05/MF A01

NAS 1.26:174072
Study of Instrument Design Options for the Columbus Spectroscopy Mission.
N85-13205/8/GAR *515,223* PC A07/MF A01

NAS 1.26:174077
Composite Structural Materials.
N85-12966/6/GAR *514,974* PC A08/MF A01

NAS 1.26:174087
Ice-Soil Mixtures: Visual and Near-Infrared Remote Sensing Techniques.
N85-13358/5/GAR *514,775* PC A02/MF A01

NAS 1.26:174089
Mars Polar Volatiles: Topographic and Geologic Setting.
N85-13708/1/GAR *514,395* PC A02/MF A01

NAS 1.26:174104
Ocean Services User Needs Assessment. Volume 1. Survey Results, Conclusions and Recommendations.
N85-13445/0/GAR *514,447* PC A07/MF A01

NAS 1.26:174105
Physics on Aircraft Wakes.
N85-12871/8/GAR *514,323* PC A02/MF A01

NAS 1.26:174106
Investigation of RF Excited CW CO2 Waveguide Lasers.
N85-13221/5/GAR *515,546* PC A03/MF A01

NAS 1.26:174108
Software Used with the Flux Mapper at the Solar Parabolic Dish Test Site.
N85-13376/7/GAR *514,921* PC A04/MF A01

NAS 1.26:174109
Concentrator Optical Characterization Using Computer Mathematical Modelling and Point Source Testing.
N85-13375/9/GAR *514,920* PC A03/MF A01

NAS 1.26:174110
Experimental Investigation of Two-Dimensional Thrust Augmenting Ejectors, Part 2.
N85-12895/7/GAR *515,685* PC A05/MF A01

NAS 1.26:174111
Experimental Investigation of Two-Dimensional Thrust Augmenting Ejectors, Part 1.
N85-12894/0/GAR *515,684* PC A06/MF A01

NAS 1.26:174112
Technologies for Space Station Autonomy.
N85-12906/2/GAR *515,713* PC A05/MF A01

NAS 1.26:174113
Preliminary Checkout, Evaluation and Calibration of a 3-Component Force Measurement System for Calibrating Propulsion Simulators for Wind Tunnel Models.
N85-12903/9/GAR *515,220* PC A09/MF A01

NAS 1.26:174115
Restoration of Multichannel Microwave Radiometric Images.
N85-13527/5/GAR *514,830* PC A03/MF A01

NAS 1.26:174116
Noise Removal in Multichannel Images.
N85-13526/7/GAR *514,829* PC A02/MF A01

NAS 1.26:174123
LANDSAT Instruments Characterization.
N85-13356/9/GAR *514,822* PC A02/MF A01

NAS 1.26:174129
Investigation of Several Aspects of LANDSAT 4/5 Data Quality.
N85-13357/7/GAR *514,823* PC A02/MF A01

NAS 1.26:174135
Magnetohydrodynamic and Gasdynamic Theories for Planetary Bow Waves.
N85-13760/2/GAR *514,399* PC A04/MF A01

NAS 1.26:174138
NASA/ASEE Summer Faculty Fellowship Program, 1984.
N85-13663/8/GAR *514,380* PC A05/MF A01

NAS 1.26:174141
Absolute Transition Probabilities of Lines in the Spectra of Astrophysical Atoms, Molecules, and Ions.
N85-13705/7/GAR *514,393* PC A02/MF A01

NAS 1.26:174142
Laboratory Studies of Atomic Collision Processes of Importance in Planetary Atmospheres.
N85-13758/6/GAR *514,397* PC A03/MF A01

NAS 1.26:174143
Time Dependent Effects at the Foot of the Chromosphere.
N85-13762/8/GAR *514,401* PC A02/MF A01

NAS 1.26:174144
Study of the Structure of Turbulent Shear Flows at Supersonic Speeds and High Reynolds Number.
N85-12865/0/GAR *515,531* PC A04/MF A01

NAS 1.26:174145
Normal Incidence, High Resolution X-Ray Telescope for Solar Coronal Observations.
N85-13699/2/GAR *514,387* PC A06/MF A01

NAS 1.26:174146
Outer Satellite Atmospheres: Their Nature and Planetary Interactions.
N85-13759/4/GAR *514,398* PC A04/MF A01

NAS 1.26:174153
Oscillator Strengths for OII Ions.
N85-13558/0/GAR *514,706* PC A02/MF A01

NAS 1.26:174154
Investigations of Severe/Tornadic Thunderstorm Development and Evolution Based on Satellite and AVE/Sesame/VAS Data.
N85-13424/5/GAR *514,416* PC A02/MF A01

NAS 1.26:174155
Lithospheric Structure in the Pacific Geoid.
N85-13365/0/GAR *514,739* PC A02/MF A01

NAS 1.26:174156
Archean Sedimentation and Tectonics in Southern Africa.
N85-13408/8/GAR *514,748* PC A02/MF A01

NAS 1.26:174157
Nondestructive Evaluation of Residual Stress in Low-Carbon Steel.
N85-13264/5/GAR *514,997* PC A03/MF A01

NAS 1.26:174158
Particle Velocity Experiments in Anorthosite and Gabbro.
N85-13407/0/GAR *514,747* PC A02/MF A01

NAS 1.26:174159
Velocity-Changing Collisional Effects in Nonlinear Atomic Spectroscopy and Photon Echo Decay in Gases.
N85-13559/8/GAR *514,707* PC A02/MF A01

NAS 1.26:174160
Scintillator-Fiber Charged Particle Track-Imaging Detector.
N85-13560/6/GAR *515,360* PC A03/MF A01

NAS 1.26:174161
International Test and Demonstration of a 1-Mw Wellhead Generator: Helical Screw Expander Power Plant.
N85-13372/6/GAR *514,946* PC A11/MF A01

NAS 1.26:174162
Multisensor Satellite Data Integration for Sea Surface Wind Speed and Direction Determination.
N85-13446/8/GAR *514,770* PC A05/MF A01

NAS 1.26:174163
Evaluation of Heat Engine for Hybrid Vehicle Application.
N85-13245/4/GAR *515,604* PC A04/MF A01

NAS 1.26:174164
RS CV sub n Binary Systems.
N85-13704/0/GAR *514,392* PC A02/MF A01

NAS 1.26:174165
Outer Atmospheres of Giant and Supergiant Stars.
N85-13703/2/GAR *514,391* PC A02/MF A01

NAS 1.26:174166
Far-Infrared Line Emission from the Galaxy.
N85-13702/4/GAR *514,390* PC A10/MF A01

NAS 1.26:174167
Analysis of the Impact of Error Detection on Computer Performance.
N85-13477/3/GAR *514,824* PC A02/MF A01

NAS 1.26:174168
Unified Method for Evaluating Real-Time Computer Controllers: A Case Study.
N85-13478/1/GAR *514,342* PC A03/MF A01

NAS 1.26:174169
Coastal Zone Color Scanner (CZCS): Imagery of Near-Surface Phytoplankton Pigment Concentrations from the First Coastal Ocean Dynamics Experiment (CODE-1), March - July 1981.
N85-13447/6/GAR *514,733* PC A05/MF A01

NAS 1.26:174170
Mission Science Value-Cost Savings from the Advanced Imaging Communication System (AICS) (Advanced Imaging Communication System).
N85-12905/4/GAR *515,283* PC A03/MF A01

NAS 1.26:174171
Dynamics of Coupled Ice-Ocean System in the Marginal Ice Zone: Study of the Mesoscale Processes and of Constitutive Equations for Sea Ice.
N85-13448/4/GAR *514,776* PC A06/MF A01

NAS 1.26:174172
Role of Freestream Turbulence Scale in Subsonic Flow Separation.
N85-12870/0/GAR *514,322* PC A03/MF A01

NAS 1.26:174173
Modulation of the Cytosolic Androgen Receptor in Striated Muscle by Sex Steroids.
N85-13468/2/GAR *514,642* PC A02/MF A01

NAS 1.26:174174
Alternative to Reduction of Surface Pressure to Sea Level.
N85-13422/9/GAR *514,415* PC A02/MF A01

NAS 1.26:174175
Undetected Error Probability for Shortened Hamming Codes.
N85-13535/8/GAR *514,860* PC A02/MF A01

NAS 1.26:174176
Transformation of Two and Three-Dimensional Regions by Elliptic Systems.
N85-13529/1/GAR *515,041* PC A02/MF A01

NAS 1.26:174711
High-Temperature Optically Activated GaAs Power Switching for Aircraft Digital Electronic Control.
N85-12901/3/GAR *514,337* PC A10/MF A01

NAS 1.26:174712
Fiber Optic, Fabry-Perot High Temperature Sensor.
N85-13594/5/GAR *515,232* PC A03/MF A01

NAS 1.26:174745
Ion Thruster System (8-cm) Cyclic Endurance Test.
N85-12937/7/GAR *515,603* PC A07/MF A01

NAS 1.26:174802
Regenerative Fuel Cell Energy Storage System for a Low Earth Orbit Space Station.
N85-13371/8/GAR *514,945* PC A07/MF A01

NAS 1.26:174810
Ion Thruster Performance Model.
N85-12935/1/GAR *515,602* PC A07/MF A01

NAS 1.26:175127
Reduction and Analysis of Data from the Plasma Wave Instruments on the IMP-6 and IMP-8 Spacecraft.
N85-12918/7/GAR *514,405* PC A03/MF A01

NAS 1.26:177321
Viscous-Inviscid Aerodynamic Analysis of Two-Dimensional Thrust Augmentors.
N85-12861/9/GAR *514,317* PC A03/MF A01

NAS 1.55:2334
Tough Composite Materials.
N85-12941/9/GAR *514,973* PC A17/MF A01

NAS 1.60:2374
Flight and Wind-Tunnel Comparisons of the Inlet-Airframe Interaction of the F-15 Airplane.
N85-12884/1/GAR *514,334* PC A03/MF A01

NAS 1.60:2380
Full-Scale Crash-Test Evaluation of Two Load-Limiting Subfloors for General Aviation Airframes.
N85-13267/8/GAR *514,338* PC A04/MF A01

NAS 1.60:2387
Local Stability Analysis for a Planar Shock Wave.
N85-12864/3/GAR *515,530* PC A02/MF A01

NAS 1.60:2394
Preliminary Study of Numerical Simulation of Thermosolutal Convection of Interest to Crystal Growth.
N85-13175/3/GAR *515,523* PC A03/MF A01

NAS 1.60:2399
Application of the Onera Model of Dynamic Stall.
N85-12862/7/GAR *514,318* PC A04/MF A01

NAS 1.60:2403
Effect of Humidity on Fretting Wear of Several Pure Metals.
N85-13006/0/GAR *514,992* PC A02/MF A01

NTIS ORDER/REPORT NUMBER INDEX

NAS 1.60:3401
Effect of Two Inner-Ring Oil-Flow Distribution Schemes on the Operating Characteristics of a 35 Millimeter Bore Ball Bearing to 2.5 Million Dn.
N85-13233/0/GAR *515,165* PC A02/MF A01

NAS 1.60:3405
Effect of Barrier Height on Friction Behavior of the Semiconductors Silicon and Gallium Arsenide in Contact with Pure Metals.
N85-13044/1/GAR *514,791* PC A03/MF A01

NAS 1.60:3406
High-Temperature Erosion of Plasma-Sprayed, Yttria-Stabilized Zirconia in a Simulated Turbine Environment.
N85-13045/8/GAR *514,961* PC A02/MF A01

NAS 1.60:3408
Effect of Lubricant Extreme-Pressure Additives on Surface Fatigue Life of AISI 9310 Spur Gears.
N85-13234/8/GAR *515,166* PC A02/MF A01

NAS 1.61:1122
Procedures for Precap Visual Inspection.
N85-13156/3/GAR *515,149* PC A05/MF A01

NASA-CP-2334
Tough Composite Materials.
N85-12941/9/GAR *514,973* PC A17/MF A01

NASA-CR-3845
Experimental Investigation of Shock-Cell Noise Reduction for Single Stream Nozzles in Simulated Flight.
N85-13550/7/GAR *515,686* PC A17/MF A01

NASA-CR-3846
Experimental Investigation of Shock-Cell Noise Reduction for Dual-Stream Nozzles in Simulated Flight.
N85-13549/9/GAR *515,687* PC A09/MF A01

NASA-CR-3852
Toughening Mechanism in Elastomer-Modified Epoxy Resins, Part 2.
N85-13046/6/GAR *515,018* PC A04/MF A01

NASA-CR-3853
Natural Laminar Flow Airfoil Design Considerations for Winglets on Low-Speed Airplanes.
N85-12863/5/GAR *514,319* PC A03/MF A01

NASA-CR-3859
Flight Tests of the Digital Integrated Automatic Landing System (Dials).
N85-12900/5/GAR *515,304* PC A07/MF A01

NASA-CR-3860
Space Medicine Research Publications: 1983-1984.
N85-13469/0/GAR *514,586* PC A04/MF A01

NASA-CR-166610
Study of Flow Past an Airfoil with a Jet Issuing from Its Lower Surface.
N85-12860/1/GAR *514,316* PC A03/MF A01

NASA-CR-168285
Advanced Automotive Diesel Assessment Program.
N85-13235/5/GAR *515,693* PC A16/MF A01

NASA-CR-171222
Selected Tether Applications in Space: An Analysis of Five Selected Concepts.
N85-12921/1/GAR *515,706* PC A10/MF A01

NASA-CR-171223
Human Role in Space. Volume 1. Executive Summary.
N85-13473/2/GAR *515,709* PC A03/MF A01

NASA-CR-171224
Human Role in Space. Volume 2. Research Analysis and Technology Report.
N85-13474/0/GAR *515,710* PC A14/MF A01

NASA-CR-171225
Human Role in Space. Volume 3: Generalizations on Human Roles in Space.
N85-13475/7/GAR *515,711* PC A04/MF A01

NASA-CR-171228
Definition of Technology Development Missions for Early Space Station Satellite Servicing. Volume 1. Executive Summary.
N85-12922/9/GAR *515,707* PC A05/MF A01

NASA-CR-171229
Definition of Technology Development Missions for Early Space Station Satellite Servicing. Volume 2. Technical.
N85-12923/7/GAR *515,708* PC A06/MF A01

NASA-CR-171230
Space Power Distribution System Technology. Volume 3. Test Facility Design.
N85-12936/9/GAR *515,719* PC A05/MF A01

NASA-CR-171233
Design, Fabrication and Delivery of a Spacelab Neutral Buoyancy Instrument Pointing System (IPS) Mockup.
N85-12934/4/GAR *514,532* PC A04/MF A01

NASA-CR-171247
Analysis of Physical-Chemical Processes Governing SSME Internal Fluid Flows.
N85-12859/3/GAR *515,696* PC A02/MF A01

NASA-CR-171255
Turbine Blade Damping Study.
N85-12890/8/GAR *515,683* PC A09/MF A01

NASA-CR-171256
Autonomous Momentum Management for Space Station, Exhibit A.
N85-12933/6/GAR *515,718* PC A04/MF A01

NASA-CR-171266
Development of Acceptance Criteria for Batches of Silane Primer for External Tank Thermal Protection System Bonding Applications.
N85-13043/3/GAR *514,681* PC A05/MF A01

NASA-CR-172333
Realistic Localizer Courses for Aircraft Instrument Landing Simulators.
N85-12885/8/GAR *514,531* PC A05/MF A01

NASA-CR-172347
System Status Display Information.
N85-12869/0/GAR *514,341* PC A04/MF A01

NASA-CR-172401
Evaluation of Automated Decisionmaking Methodologies and Development of an Integrated Robotic System Simulation.
N85-13516/6/GAR *514,829* PC A08/MF A01

NASA-CR-172410-V-1
Flutter Parametric Studies of Cantilevered Twin-Engine-Transport Type Wing with and Without Winglet. Volume 1: Low-Speed Investigations.
N85-13269/4/GAR *514,339* PC A05/MF A01

NASA-CR-172410-V-2
Flutter Parametric Studies of Cantilevered Twin-Engine Transport Type Wing with and Without Winglet. Volume 2: Transonic and Density Effect Investigations.
N85-13270/2/GAR *514,340* PC A07/MF A01

NASA-CR-172478
Generalized Formulation of TVD (Total Variation Diminution) Lax-Wendroff Schemes.
N85-13528/3/GAR *515,040* PC A02/MF A01

NASA-CR-172482
Response Measurements for Two Building Structures Excited by Noise from a Large Horizontal Axis Wind Turbine Generator.
N85-13552/3/GAR *515,191* PC A02/MF A01

NASA-CR-174001
Scattering Models in the Microwave Regime.
N85-13361/9/GAR *515,591* PC A04/MF A01

NASA-CR-174065
Autonomous Momentum Management for Space Station.
N85-12931/0/GAR *515,716* PC A04/MF A01

NASA-CR-174068
Conference on the Origin of the Moon.
N85-13709/9/GAR *514,396* PC A04/MF A01

NASA-CR-174069
Activities at the Lunar and Planetary Institute.
N85-13694/3/GAR *514,386* PC A05/MF A01

NASA-CR-174072
Study of Instrument Design Options for the Columbus Spectroscopy Mission.
N85-13205/8/GAR *515,223* PC A07/MF A01

NASA-CR-174077
Composite Structural Materials.
N85-12966/6/GAR *514,974* PC A08/MF A01

NASA-CR-174087
Ice-Soil Mixtures: Visual and Near-Infrared Remote Sensing Techniques.
N85-13358/5/GAR *514,775* PC A02/MF A01

NASA-CR-174089
Mars Polar Volatiles: Topographic and Geologic Setting.
N85-13708/1/GAR *514,395* PC A02/MF A01

NASA-CR-174104
Ocean Services User Needs Assessment. Volume 1. Survey Results, Conclusions and Recommendations.
N85-13445/0/GAR *514,447* PC A07/MF A01

NASA-CR-174105
Physics on Aircraft Wakes.
N85-12871/8/GAR *514,323* PC A02/MF A01

NASA-CR-174106
Investigation of RF Excited CW CO2 Waveguide Lasers.
N85-13221/5/GAR *515,546* PC A03/MF A01

NASA-CR-174108
Software Used with the Flux Mapper at the Solar Parabolic Dish Test Site.
N85-13376/7/GAR *514,921* PC A04/MF A01

NASA-CR-174109
Concentrator Optical Characterization Using Computer Mathematical Modelling and Point Source Testing.
N85-13375/9/GAR *514,920* PC A03/MF A01

NASA-CR-174110
Experimental Investigation of Two-Dimensional Thrust Augmenting Ejectors, Part 2.
N85-12895/7/GAR *515,685* PC A05/MF A01

NASA-CR-174111
Experimental Investigation of Two-Dimensional Thrust Augmenting Ejectors, Part 1.
N85-12894/0/GAR *515,684* PC A06/MF A01

NASA-CR-174112
Technologies for Space Station Autonomy.
N85-12908/2/GAR *515,713* PC A05/MF A01

NASA-CR-174113
Preliminary Checkout, Evaluation and Calibration of a 3-Component Force Measurement System for Calibrating Propulsion Simulators for Wind Tunnel Models.
N85-12903/9/GAR *515,220* PC A09/MF A01

NASA-CR-174115
Restoration of Multichannel Microwave Radiometric Images.
N85-13527/5/GAR *514,830* PC A03/MF A01

NASA-CR-174116
Noise Removal in Multichannel Images.
N85-13526/7/GAR *514,829* PC A02/MF A01

NASA-CR-174123
LANDSAT Instruments Characterization.
N85-13356/9/GAR *514,822* PC A02/MF A01

NASA-CR-174129
Investigation of Several Aspects of LANDSAT 4/5 Data Quality.
N85-13357/7/GAR *514,823* PC A02/MF A01

NASA-CR-174135
Magnetohydrodynamic and Gasdynamic Theories for Planetary Bow Waves.
N85-13760/2/GAR *514,399* PC A04/MF A01

NASA-CR-174138
NASA/ASEE Summer Faculty Fellowship Program, 1984.
N85-13663/8/GAR *514,380* PC A05/MF A01

NASA-CR-174141
Absolute Transition Probabilities of Lines in the Spectra of Astrophysical Atoms, Molecules, and Ions.
N85-13705/7/GAR *514,393* PC A02/MF A01

NASA-CR-174142
Laboratory Studies of Atomic Collision Processes of Importance in Planetary Atmospheres.
N85-13758/6/GAR *514,397* PC A03/MF A01

NASA-CR-174143
Time Dependent Effects at the Foot of the Chromosphere.
N85-13762/8/GAR *514,401* PC A02/MF A01

NASA-CR-174144
Study of the Structure of Turbulent Shear Flows at Supersonic Speeds and High Reynolds Number.
N85-12865/0/GAR *515,531* PC A04/MF A01

NASA-CR-174145
Normal Incidence, High Resolution X-Ray Telescope for Solar Coronal Observations.
N85-13699/2/GAR *514,387* PC A06/MF A01

NASA-CR-174146
Outer Satellite Atmospheres: Their Nature and Planetary Interactions.
N85-13759/4/GAR *514,398* PC A04/MF A01

NASA-CR-174153
Oscillator Strengths for OII Ions.
N85-13558/0/GAR *514,706* PC A02/MF A01

NASA-CR-174154
Investigations of Severe/Tornadic Thunderstorm Development and Evolution Based on Satellite and AVE/Sesame/VAS Data.
N85-13424/5/GAR *514,416* PC A02/MF A01

NASA-CR-174155
Lithospheric Structure in the Pacific Geoid.
N85-13365/0/GAR *514,739* PC A02/MF A01

NASA-CR-174156
Archean Sedimentation and Tectonics in Southern Africa.
N85-13408/8/GAR *514,748* PC A02/MF A01

NASA-CR-174157
Nondestructive Evaluation of Residual Stress in Low-Carbon Steel.
N85-13264/5/GAR *514,997* PC A03/MF A01

NASA-CR-174158
Particle Velocity Experiments in Anorthosite and Gabbro.
N85-13407/0/GAR *514,747* PC A02/MF A01

NASA-CR-174159
Velocity-Changing Collisional Effects in Nonlinear Atomic Spectroscopy and Photon Echo Decay in Gases.
N85-13559/8/GAR *514,707* PC A02/MF A01

NASA-CR-174160
Scintillator-Fiber Charged Particle Track-Imaging Detector.
N85-13560/6/GAR *515,360* PC A03/MF A01

NASA-CR-174161
International Test and Demonstration of a 1-Mw Wellhead Generator: Helical Screw Expander Power Plant.
N85-13372/6/GAR *514,946* PC A11/MF A01

NASA-CR-174162
Multisensor Satellite Data Integration for Sea Surface Wind Speed and Direction Determination.
N85-13446/8/GAR *514,770* PC A05/MF A01

NASA-CR-174163
Evaluation of Heat Engine for Hybrid Vehicle Application.
N85-13245/4/GAR *515,604* PC A04/MF A01

NASA-CR-174164
RS CV sub n Binary Systems.
N85-13704/0/GAR *514,392* PC A02/MF A01

NASA-CR-174165
Outer Atmospheres of Giant and Supergiant Stars.
N85-13703/2/GAR *514,391* PC A02/MF A01

NASA-CR-174166
Far-Infrared Line Emission from the Galaxy.
N85-13702/4/GAR *514,390* PC A10/MF A01

NASA-CR-174167
Analysis of the Impact of Error Detection on Computer Performance.
N85-13477/3/GAR *514,824* PC A02/MF A01

NASA-CR-174168
Unified Method for Evaluating Real-Time Computer Controllers: A Case Study.
N85-13478/1/GAR *514,342* PC A03/MF A01

NASA-CR-174169
Coastal Zone Color Scanner (CZCS): Imagery of Near-Surface Phytoplankton Pigment Concentrations from the First Coastal Ocean Dynamics Experiment (CODE-1), March - July 1981.
N85-13447/6/GAR *514,733* PC A05/MF A01

NASA-CR-174170
Mission Science Value-Cost Savings from the Advanced Imaging Communication System (AICS) (Advanced Imaging Communication System).
N85-12905/4/GAR *515,263* PC A03/MF A01

NASA-CR-174171
Dynamics of Coupled Ice-Ocean System in the Marginal Ice Zone: Study of the Mesoscale Processes and of Constitutive Equations for Sea Ice.
N85-13448/4/GAR *514,776* PC A06/MF A01

NASA-CR-174172
Role of Freestream Turbulence Scale in Subsonic Flow Separation.
N85-12870/0/GAR *514,322* PC A03/MF A01

NASA-CR-174173
Modulation of the Cytosolic Androgen Receptor in Striated Muscle by Sex Steroids.
N85-13468/2/GAR *514,642* PC A02/MF A01

NASA-CR-174174
Alternative to Reduction of Surface Pressure to Sea Level.
N85-13422/9/GAR *514,415* PC A02/MF A01

NASA-CR-174175
Undetected Error Probability for Shortened Hamming Codes.
N85-13535/8/GAR *514,860* PC A02/MF A01

NASA-CR-174176
Transformation of Two and Three-Dimensional Regions by Elliptic Systems.
N85-13529/1/GAR *515,041* PC A02/MF A01

NASA-CR-174711
High-Temperature Optically Activated GaAs Power Switching for Aircraft Digital Electronic Control.
N85-12901/3/GAR *514,337* PC A10/MF A01

NASA-CR-174712
Fiber Optic, Fabry-Perot High Temperature Sensor.
N85-13594/5/GAR *515,232* PC A03/MF A01

NASA-CR-174745
Ion Thruster System (8-cm) Cyclic Endurance Test.
N85-12937/7/GAR *515,603* PC A07/MF A01

NASA-CR-174802
Regenerative Fuel Cell Energy Storage System for a Low Earth Orbit Space Station.
N85-13371/8/GAR *514,945* PC A07/MF A01

NASA-CR-174810
Ion Thruster Performance Model.
N85-12935/1/GAR *515,602* PC A07/MF A01

NASA-CR-175127
Reduction and Analysis of Data from the Plasma Wave Instruments on the IMP-6 and IMP-8 Spacecraft.
N85-12918/7/GAR *514,405* PC A03/MF A01

NASA-CR-177321
Viscous-Inviscid Aerodynamic Analysis of Two-Dimensional Thrust Augmentors.
N85-12861/9/GAR *514,317* PC A03/MF A01

NASA-RP-1122
Procedures for Precap Visual Inspection.
N85-13156/3/GAR *515,149* PC A05/MF A01

NASA-SP-7011(265)
Aerospace Medicine and Biology, a Continuing Bibliography with Indexes.
N85-13467/4/GAR *514,585* PC$7.00

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N85-12858/5/GAR *514,315* PC$6.00

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N85-12867/6/GAR *515,712* PC A04/MF A01

NASA-TM-77488
Structural Changes During Milling of Aluminum Oxide Powders.
N85-13008/6/GAR *514,959* PC A02/MF A01

NASA-TM-77495
Study of the Pore Structure of Ceramics Prepared by the Slip Casting Method.
N85-13048/2/GAR *514,962* PC A02/MF A01

NASA-TM-77508
Alpha-Form of the Hydroxides of Bivalent Metals.
N85-13009/4/GAR *514,705* PC A03/MF A01

NASA-TM-77589
International Comparative Study of Systems for the Government Advancement of Research and Development.
N85-13689/3/GAR *514,500* PC A13/MF A01

NASA-TM-83677
NASA Redox Storage System Development Project. Final Report.
DE85000993/GAR *514,954* PC A03/MF A01

NASA-TM-83790
Control Aspects of the Schuchuli Village Stand-Alone Photovoltaic Power System.
N85-13157/1/GAR *514,944* PC A03/MF A01

NASA-TM-84946
Interplanetary Radio Storms. 2: Emission Levels and Solar Wind Speed in the Range 0.05-0.8 AU.
N85-13761/0/GAR *514,400* PC A03/MF A01

NASA-TM-85075
Petrologic Model of the Northern Mississippi Embayment Based on Satellite Magnetic and Ground Based Geophysical Data.
N85-13406/2/GAR *514,746* PC A02/MF A01

NASA-TM-85721
Evaluation of the Langley 4- by 7-Meter Tunnel for Propeller Noise Measurements.
N85-13553/1/GAR *515,229* PC A03/MF A01

NASA-TM-85804
Conceptual Design for Scaled Truss Antenna Flight Experiment.
N85-12932/8/GAR *515,717* PC A03/MF A01

NASA-TM-85915
Test Experience on an Ultrareliable Computer Communication Network.
N85-13514/3/GAR *514,827* PC A02/MF A01

NASA-TM-86013
Detection of Submillimeter Polarization in the Orion Nebula.
N85-13700/8/GAR *514,386* PC A02/MF A01

NASA-TM-86015
Fiber Optic Data Bus Using Frequency Division Multiplexing (FDM) (Frequency Division Multiplexing) and an Asymmetric Coupler.
N85-13139/9/GAR *515,284* PC A02/MF A01

NASA-TM-86021
Development of Computational Fluid Dynamics at NASA Ames Research Center.
N85-12866/8/GAR *514,320* PC A02/MF A01

NASA-TM-86022
Far-Infrared Photometry of Compact Extragalactic Sources: OJ 187 and BL Lac.
N85-13701/6/GAR *514,389* PC A02/MF A01

NASA-TM-86035
Comparison of Wortmann Airfoil Computer-Generated Lift and Drag Polars with Flight and Wind Tunnel Results.
N85-12868/4/GAR *514,321* PC A02/MF A01

NASA-TM-86263
Buckling Analysis for Rectangular Orthotropic Plates with Centrally Located Cutouts.
N85-13268/6/GAR *515,578* PC A03/MF A01

NASA-TM-86276
Oil-Flow Study of a Space Shuttle Orbiter Tip-Fin Controller.
N85-12920/3/GAR *515,714* PC A04/MF A01

NASA-TM-86339
Project Resources Planning and Control.
N85-13666/1/GAR *514,533* PC A07/MF A01

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N85-13409/6/GAR *514,407* PC A05/MF A01

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Static Jet Noise Test Results of Four 0.35 Scale-Model QCGAT(Quiet Clean General Aviation Turbofan) Mixer Nozzles.
N85-13551/5/GAR *515,689* PC A03/MF A01

NASA-TM-86874
Liquid Phase Products and Solid Deposit Formation from Thermally Stressed Model Jet Fuels.
N85-13066/4/GAR *515,668* PC A03/MF A01

NASA-TM-86888
Stirling Material Technology.
N85-13007/8/GAR *515,692* PC A02/MF A01

NASA-TM-86901
Overview of Waste Heat Utilization Systems.
N85-13692/7/GAR *514,922* PC A02/MF A01

NASA-TM-87372
Documentation for the Machine-Readable Version of the MK Classification Extension Catalogue Morris-Kennedy (1983).
N85-13491/4/GAR *514,382* PC A02/MF A01

NASA-TM-87375
Launch Summary for 1978 - 1982.
N85-12924/5/GAR *515,722* PC A06/MF A01

NASA-TM-87376
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NASA-TM-87392
NASA/ASEE Summer Faculty Fellowship Program, 1984.
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ASEE-NASA Summer Faculty Fellowship Program (Aeronautics and Research), 1984.
N85-13664/6/GAR *514,431* PC A04/MF A01

NASA-TP-2374
Flight and Wind-Tunnel Comparisons of the Inlet-Airframe Interaction of the F-15 Airplane.
N85-12884/1/GAR *514,334* PC A03/MF A01

NASA-TP-2380
Full-Scale Crash-Test Evaluation of Two Load-Limiting Subfloors for General Aviation Airframes.
N85-13267/8/GAR *514,338* PC A04/MF A01

NASA-TP-2387
Local Stability Analysis for a Planar Shock Wave.
N85-12864/3/GAR *515,530* PC A02/MF A01

NASA-TP-2394
Preliminary Study of Numerical Simulation of Thermosolutal Convection of Interest to Crystal Growth.
N85-13175/3/GAR *515,523* PC A03/MF A01

NASA-TP-2399
Application of the Onera Model of Dynamic Stall.
N85-12862/7/GAR *514,318* PC A04/MF A01

NASA-TP-2403
Effect of Humidity on Fretting Wear of Several Pure Metals.
N85-13006/0/GAR *514,992* PC A02/MF A01

NASA-TP-2404
Effect of Two Inner-Ring Oil-Flow Distribution Schemes on the Operating Characteristics of a 35 Millimeter Bore Ball Bearing to 2.5 Million Dn.
N85-13233/0/GAR *515,185* PC A02/MF A01

NASA-TP-2405
Effect of Barrier Height on Friction Behavior of the Semiconductors Silicon and Gallium Arsenide in Contact with Pure Metals.
N85-13044/1/GAR *514,791* PC A02/MF A01

NASA-TP-2406
High-Temperature Erosion of Plasma-Sprayed, Yttria-Stabilized Zirconia in a Simulated Turbine Environment.
N85-13045/8/GAR *514,961* PC A02/MF A01

NASA-TP-2408
Effect of Lubricant Extreme-Pressure Additives on Surface Fatigue Life of AISI 9310 Spur Gears.
N85-13234/8/GAR *515,186* PC A02/MF A01

NATICK/TR-84/015
Psychophysical Bases for the Sensory Assessment of Rations.
AD-A148 849/3/GAR *514,541* PC A07/MF A01

NATICK/TR-85/009
Cold Weather 83 Evaluation of the Mobile Food Service Unit and Tray Packs.
AD-A148 850/1/GAR *514,604* PC A03/MF A01

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Field Feeding System to Support USMC Forces in the 1990s.
AD-A148 953/3/GAR *514,606* PC A06/MF A01

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NBSIR-84-2930
Short Duration Winter-Time Performances of Different Passive Solar Systems.
DE85000850/GAR *515,067* PC A04/MF A01

NBSIR-84/2971
Thermodynamic Properties of Isobutane-Isopentane Mixtures from 240 to 600K and up to 20 MPa (with Supplemental Tables from -40 to + 600F and up to 1000 psia).
PB85-154581/GAR *514,725* PC A09/MF A01

NBSIR-84/2980
Research Priorities for Improving the Effectiveness of Active Solar Hot Water and Space Conditioning Systems.
PB85-153443/GAR *515,076* PC A05/MF A01

NCEL-TN-1707
Model and Small-Scale Tests to Evaluate the Performance of Drag Anchors in Combination.
AD-A148 887/3/GAR *515,173* PC A04/MF A01

NCEL-TN-1709
Reliability, Availability, and Maintainability of the Heat Recovery Incinerator at Naval Air Station , Jacksonville.
AD-A148 884/0/GAR *515,057* PC A05/MF A01

NCEL-TN-1711
Solid Waste Management Options for Naval Installations on Guam.
AD-A148 947/5/GAR *515,081* PC A03/MF A01

NTIS ORDER/REPORT NUMBER INDEX

NCEL-TR-911
XSP(Experimental Static Penetrometer) Cone Penetrometer: A Performance Evaluation.
AD-A148 886/5/GAR *514,777* PC A04/MF A01

NCHSR-84/219
Knowledge of Their Health Insurance Coverage by the Elderly.
PB85-139921/GAR *514,588* PC A02/MF A01

NCI/ICRDB/OT-84/08
Postoperative Adjuvant Therapy of Breast Cancer.
PB84-922808/GAR *514,587* PC$8.00/MF A01

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NEL-691
Creep Characterization of a Type 316 Austenitic Steel.
PB85-139665/GAR *515,001* PC E04/MF E04

NEL-693
Effect of Hydrostatic Pressure on the Tensile Properties of Alpha Uranium.
PB85-139640/GAR *515,000* PC E04/MF E04

NEPRF-TR-84-01
Processing of Global Area Coverage (GAC) Data of the TIROS-N/NOAA Series Polar Orbiters.
AD-A148 992/1/GAR *514,411* PC A03/MF A01

NIH-PUB-81-2077
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SHR-0011823/GAR *514,563* PC A16/MF A01

NIMH-85-464
Social Roles and the Health of American Women.
PB85-147452/GAR *514,620* PC A02/MF A01

NIMH-85-465
Readjustment of Older Persons After Acute Hospitalization.
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Building 1 Cooling Tower Ozone Project.
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NP-4770426
Iran - Energy Situation 1983.
DE84770426/GAR *514,863* PC A02/MF A01

NP-4770470
CSSR - Energy Situation 1980/81.
DE84770470/GAR *514,864* PC A03/MF A01

NP-4770477
Industrial Exhaust-Air Purification Employing the Process of Adsorption to Activated Carbon.
DE84770477/GAR *515,005* PC A02/MF A01

NP-4770478
Combustion of Industrial Waste Gases, Residual and Waste Liquids and Fluids.
DE84770478/GAR *514,986* PC A02/MF A01

NP-4770486
Flywheel Energy Storage Systems as Vehicle Drive Elements.
DE84770486/GAR *514,951* PC A09/MF A01

NP-4770487
Indonesia - Energy Situation 1982/83.
DE84770487/GAR *514,896* PC A03/MF A01

NP-4770488
Nigeria - Energy Situation 1982/83.
DE84770488/GAR *514,867* PC A02/MF A01

NP-4770493
Rotational Sound Development in Axial Turbomachinery and the Propagation in the Connected Tubing.
DE84770493/GAR *514,888* PC A07/MF A01

NP-4770495
Experimental Investigations on the Reaction Structure in Folded Pre-Mixed Flame Fronts.
DE84770495/GAR *515,594* PC A07/MF A01

NP-4770496
Theoretical and Experimental Investigations on the Fluid-Structure-Interactions in an Oscillation Model of a Pressurized Water Reactor.
DE84770496/GAR *515,435* PC A06/MF A01

NP-4770498
Noise Emission of Technical Diffusion Flames in Dependence of Mixing Parameters, Burner Dimensions and Air Preheating for Fuel Gases with Different Flame Velocities.
DE84770498/GAR *515,595* PC A07/MF A01

NP-4770500
Joint Venezuelan-German Feasibility Study: Integrated Production and Upgrading Including Energy Supply for Orinoco Heavy Oil. Pt. A.
DE84770500/GAR *515,606* PC A03/MF A01

NP-4770505
Some Environmental Aspects of Optimal Economic Growth.
DE84770505/GAR *514,459* PC A02/MF A01

NP-4770507
Optimal Growth Policies for Resource-Dependent Open Economies.
DE84770507/GAR *514,460* PC A02/MF A01

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PB85-928000/GAR
All Non-Communist Country Reports.
PB85-928000/GAR *514,492* Standing Order
PDR/CFDU-IC/14
Organ-Pipe Oscillation.
N85-13199/3/GAR *515,178* PC A03/MF A01
PDR/CFDU-IC/15
Laminar Jet Issuing into Stagnant Surroundings.
N85-13200/9/GAR *515,538* PC A03/MF A01
PGD-PUB-369
Ice-Soil Mixtures: Visual and Near-Infrared Remote Sensing Techniques.
N85-13358/5/GAR *514,775* PC A02/MF A01
PLI-1268-1
International Comparative Study of Systems for the Government Advancement of Research and Development.
N85-13689/3/GAR *514,500* PC A13/MF A01
PNL-SA-11657
Hydrologic Considerations for Rock RIPRAP Protection of Uranium Tailings Impoundments.
DE85000826/GAR *515,395* PC A02/MF A01
PNL-SA-12043
Prototype Firing Range Air Cleaning System.
DE85000360/GAR *515,176* PC A03/MF A01
PNL-SA-12113
In Situ gamma-Ray Spectrometric Analysis of Radionuclide Distributions at a Commercial Shallow Land Burial Site.
DE85002376/GAR *515,411* PC A02/MF A01
PNL-SA-12187
Krypton-85 Health Risk Assessment for a Nuclear Fuel Reprocessing Plant.
DE85000838/GAR *514,615* PC A02/MF A01
PNL-SA-12201
Special Function Instruments for Binary Cycle Geothermal Power Plants.
DE85003109/GAR *514,915* PC A02/MF A01
PNL-SA-12298
Development and Evaluation of Supercritical Fluid Chromatography/Mass Spectrometry for Polar and High Molecular Weight Coal Components.
DE85000827/GAR *515,623* PC A02/MF A01
PNL-SA-12382
Evaluation of Chemical Stabilizers and Windscreens for Wind Erosion Control of Uranium Mill Tailings.
DE85000828/GAR *515,396* PC A02/MF A01
PNL-SA-12401
Pulp and Paper Industry Energy Impacts Through Implementation of Biotechnologies.
DE85002377/GAR *515,019* PC A02/MF A01
PNL-SA-12490
Influence of Individual Reflections on the Precision of Parameter Estimates in Least Squares Refinement.
DE85000830/GAR *515,521* PC A03/MF A01
PNL-SA-12508
Transport Assessment - Arid: Measurement and Prediction of Water Movement Below the Root Zone.
DE85000834/GAR *515,398* PC A02/MF A01
PNL-SA-12518
Organic Complexant-Enhanced Mobility of Toxic Elements in Low-Level Wastes.
DE85002375/GAR *515,410* PC A02/MF A01
PNL-SA-12540
Portable Microdosimetry System.
DE85000841/GAR *514,655* PC A02/MF A01
PNL-SA-12560
Engineered Sorbent Barriers for Low-Level Waste.
DE85000833/GAR *515,397* PC A02/MF A01
PNL-SA-12662
Use of Capture Data to Quantify Change and Test for Effects on the Abundance of Wild Populations.
DE85002155/GAR *514,571* PC A19/MF A01
PNL-4161
Comparison of Structural Computer Programs Used for the Analysis of Spent Fuel Shipping Casks.
DE85002444/GAR *515,385* PC A03/MF A01
PNL-4506
User's Guide for the BNW-III Optimization Code for Modular Dry/Wet-Cooled Power Plants.
DE85001456/GAR *514,935* PC A06/MF A01
PNL-4954
Pipe-to-Pipe Impact Program.
DE84013162/GAR *515,429* PC A05/MF A01
PNL-5040
Radionuclide Migration in Groundwater - Annual Report for FY 1983.
NUREG/CR-3712/GAR *515,423* PC A07/MF A01
PNL-5047
Predicting Long-Term Moisture Contents of Earthen Covers at Uranium Mill Tailings Sites.
DE85000777/GAR *515,392* PC A03/MF A01
PNL-5069
Effects of Hydrologic Variables on Rock Riprap Design for Uranium Tailings Impoundments,
NUREG/CR-3752/GAR *515,418* PC A04/MF A01
PNL-5121
Development, Use and Control of Maintenance Procedures in Nuclear Power Plants: Problems and Recommendations.
NUREG/CR-3817/GAR *515,365* PC A06/MF A01
PNL-5142
Underground Pumped Hydroelectric Storage.
DE85000288/GAR *514,953* PC A04/MF A01
PNL-5186
Evaluation of Welded and Repair-Welded Stainless Steel for Light Water Reactor (LWR) Service: Compositional Effects on the Sensitization of Austenitic Stainless Steels.
NUREG/CR-3918/GAR *514,990* PC A04/MF A01
PNL-5240
In Situ Vitrification Pilot-Scale Radioactive Test.
DE85002671/GAR *515,416* PC A04/MF A01
PNL-5261
Leak Detectors for Organic Rankine Cycle Power Plants: On-Line and Manual Methods.
DE85002792/GAR *514,943* PC A04/MF A01
PNL-5280
Capabilities of Laser Diagnostics for Combustion and Flowfields.
DE85002661/GAR *515,209* PC A05/MF A01

PNL-5295
Opportunities for Energy Conservation Through Biotechnology.
DE85002660/GAR *515,661* PC **A05/MF A01**

PNL-5300-VOL-1
Bivalve Fouling of Nuclear Power Plant Service-Water Systems. Volume 1. Correlation of Bivalve Biological Characteristics and Raw-Water System Design,
NUREG/CR-4070-V1/GAR *514,732* PC **A07/MF A01**

PPPL-2120
First-Wall and Limiter Conditioning in TFTR.
DE85002714/GAR *515,336* PC **A02/MF A01**

PPPL-2129
Safety Assessment for the RF Test Facility.
DE84017063/GAR *515,310* PC **A05/MF A01**

PPPL-2147
Collective Effects in Spin Polarized Plasmas.
DE85002702/GAR *515,572* PC **A02/MF A01**

PPPL-2149
PPPL Tokamak Program.
DE85002703/GAR *515,334* PC **A03/MF A01**

PPPL-2153
Ohm's Law for Mean Magnetic Fields.
DE85002706/GAR *515,526* PC **A02/MF A01**

PPPL-2160
Two-Chamber Model for Divertors with Plasma Recycling.
DE85002711/GAR *515,335* PC **A02/MF A01**

PR-1
Physics on Aircraft Wakes.
N85-12871/8/GAR *514,323* PC **A02/MF A01**

PREPRINT-410
Search for the Radiative Decay of a Cosmic Relic Particle with IUE.
N85-13707/3/GAR *514,394* PC **A02/MF A01**

PROCES-VERBAL-43/946/F
Perfectionnement des Lois de Fissuration par Fatigue sous Chargement Complexe (Perfecting the Fatigue Cracking Laws under Complex Loads),
PB85-145068/GAR *515,006* PC **E04/MF E04**

PTB-ME-61
Experimentelle Zustandsgleichung fuer Bosonenga (Experimental Equations of State for Boson Gases).
N85-13659/6/GAR *515,588* PC **A02/MF A01**

QE-3/84
Axial Velocity Spread Acceptance of Free Electron Lasers.
AD-A149 024/2/GAR *515,544* PC **A03/MF A01**

R-1/83
Construction References No. 1, 1983.
PB85-144707/GAR *515,194* PC **E08/MF E08**

R-1/84
Construction References No. 1, 1984.
PB85-142677/GAR *515,193* PC **E08/MF E08**

R-10-21-37
Register of Products Manufactured in South Africa, 1979 (Updated to 1982) (Register van Produkte in Suid-Afrika Vervaardig, 1979 (Bygewerk tot 1982)).
PB85-139442/GAR *514,452* PC **E13/MF E01**

R-84-SRD-050
Kinetics of Nitric Oxide Formation in Laminar and Turbulent Methane Combustion.
PB85-149698/GAR *514,716* PC **A05/MF A01**

R-88
Water Quality Modelling, Forecasting and Control,
PB85-139434/GAR *515,095* PC **E09/MF E09**

R-90
Review of British Flood Forecasting Practice,
PB85-140515/GAR *514,754* PC **E07/MF E07**

R-2924-AID
Improving Infant Nutrition, Health and Survival: Policy and Program Implications from the Malaysian Family Life Survey,
PB85-141653/GAR *514,607* PC **A02/MF A01**

R-2925-AID
Birthspacing, Fertility, and Family Planning: Policy and Program Implications from the Malaysian Family Life Survey,
PB85-143774/GAR *514,558* PC **A03/MF A01**

R-7552-07
Process and Implementation Issues in the Design and Conduct of Programs to Aid the Reemployment of Dislocated Workers,
PB85-146702/GAR *514,539* PC **A14/MF A01**

R-30556
Biogasification of Walt Disney World Biomass Waste Blend.
PB85-156958/GAR *515,674* PC **A09/MF A01**

R-30571
Biological Gasification of Renewable Resources.
PB85-156966/GAR *515,675* PC **A08/MF A01**

R-824122
Long Span Bridge Deflections.
PB85-138683/GAR *515,192* PC **A08/MF A01**

RADC/ETR-84-0013
Nulling at Symmetric Pattern Location with Phase-Only Weight Control.
AD-A148 940/0/GAR *514,861* PC **A02/MF A01**

RADC/ETR-84-0014
A Proof of the Odd-Symmetry of the Phases for Minimum Weight Perturbation Phase-Only Null Synthesis.
AD-A148 976/4/GAR *514,862* PC **A02/MF A01**

RAL-84-097
Dynamical Studies Using Muons,
PB85-138733/GAR *515,585* PC **E03/MF E03**

RAND/R-2613-DOE/RC
Market Behavior under Partial Price Controls: The Case of the Retail Gasoline Market.
DE85002666/GAR *515,662* PC **A04/MF A01**

REF-70/84
Scales of Deconfinement,
PB85-139772/GAR *515,567* PC **E03/MF E03**

REF-72/84
Deconfining Transitions in 2+ 1 Dimensional SU(3) and SU(4) Gauge Theories,
PB85-139764/GAR *515,575* PC **E03/MF E03**

REF-77/84
Nuclear Effects in Deep Inelastic Lepton Scattering,
PB85-139749/GAR *515,565* PC **E03/MF E03**

REF-80/84
Derivative Expansions of Fermion Determinants: Anomaly-Induced Vertices, Goldstone-Wilczek Currents, and Skyrme Terms,
PB85-139756/GAR *515,566* PC **E03/MF E03**

REPT-11/1983
Energieuebertraege bei Atom-Molekuel-Streuexperimenten AM Beispiel der Systeme SF6-AR, CF4-Ne und Xe-CO2 im I 1 Ev-Bereich (Energy Transfer in Atom-Molecule Scattering Experiments in the 1EV Region with SF6-AR, CF4-Ne and Xe-CO2 Systems as Examples).
N85-13588/7/GAR *514,708* PC **A06/MF A01**

REPT-17.202
Essai 17.202: Caracterisation de Resine Polyimide (Polyimide Resin Characteristics, Test).
N85-13049/0/GAR *514,979* PC **A03/MF A01**

REPT-84/1
Interval Mathematics Reports.
N85-13536/6/GAR *515,042* PC **A05/MF A01**

REPT-84-SRD-041
Toughening Mechanism in Elastomer-Modified Epoxy Resins, Part 2.
N85-13046/6/GAR *515,018* PC **A04/MF A01**

REPT-85008
Detection of Submillimeter Polarization in the Orion Nebula.
N85-13700/8/GAR *514,388* PC **A02/MF A01**

REPT-85016
Far-Infrared Photometry of Compact Extragalactic Sources: OJ 187 and BL Lac.
N85-13701/6/GAR *514,389* PC **A02/MF A01**

RHO-BW-ST-61-P
Assessment of Drilling Fluid Tracers Used to Monitor Borehole Development for Hydrochemical Sampling.
DE85001222/GAR *515,400* PC **A05/MF A01**

RHO-PB-SR-10-B-WM-JULY-84
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DE85000558/GAR *515,391* PC **A06/MF A01**

RHO-RE-EV-47-P
Spent Fuel Processing in Support of the New Production Reactor.
DE85001454/GAR *515,478* PC **A25/MF A01**

RHO-RE-SR-37-P
Closeout Report for the Decontamination and Decommissioning of the 203-S, 204-S, 205-S Facilities.
DE85002502/GAR *515,414* PC **A04/MF A01**

RR-6/83
Structural Use of Chipboard for Flooring: State of the Art Report.
PB85-139855/GAR *515,122* PC **E03/MF E03**

RR-12
Role of Mining in the South African Economy,
PB85-139228/GAR *514,467* PC **E12/MF E01**

RR-84-1
Employee and Customer Perceptions of Service in Banks: Replication and Extension.
AD-A148 907/9/GAR *514,542* PC **A03/MF A01**

RSRE-MEMO-3678
Implementing Waveguide Bandwidth Six-Port Reflectometer Circuits at Millimetric Wavelengths.
N85-13155/5/GAR *515,222* PC **A02/MF A01**

RTI-116
Di(n-Butyl) Phthalate: Reproduction and Fertility Assessment in CD-1 Mice When Administered in the Feed.
PB85-144798/GAR *514,673* PC **A05/MF A01**

SAIC-84/1782
Development of Process for Combined NO/sub X//SO/sub X/ Control. Technical Progress Report, September 1984.
DE85000754/GAR *515,087* PC **A02/MF A01**

SAND-82-1492
WESF sup 137 Cs gamma Ray Sources.
DE85000676/GAR *515,562* PC **A04/MF A01**

SAND-82-7157/4
Analysis of Concentrating PV-T Systems for the Commercial/Industrial Sector. Volume IV. Design Analysis and Trade-off Study.
DE85002650/GAR *514,910* PC **A14/MF A01**

SAND-82-8180
Molten Salt Solar Receiver Subsystem Research Experiment. Phase 1, Final Report. Volume 1. Executive Summary. Volume 2. Technical.
DE85000874/GAR *514,903* PC **A20/MF A01**

SAND-83-1750
Fuel Disruption Mechanisms Determined In-Pile in the ACRR (Annular Core Research Reactor).
NUREG/CR-3780/GAR *515,482* PC **A03/MF A01**

SAND-83-1893C
CP DDT Detonators. II. Output Characterization.
DE84017251/GAR *515,497* PC **A02/MF A01**

SAND-84-0532
Accelerated Aging of Aluminized Acrylic Solar Mirror Materials.
DE85002683/GAR *514,911* PC **A02/MF A01**

SAND-84-0662
Sol-Gel-Derived AR Coatings for Solar Receivers.
DE85000192/GAR *514,896* PC **A03/MF A01**

SAND-84-0810C
Transport and Capture of Colloidal Particles in Single Fractures.
DE85000413/GAR *515,390* PC **A02/MF A01**

SAND-84-0984C
Mini-Modal Testing of Wind Turbines Using Novel Excitation.
DE85000666/GAR *514,902* PC **A02/MF A01**

SAND-84-1072-VOL-1
Reactor Safety Research Quarterly Report January-March 1984, Volume 29.
NUREG/CR-3816-V1/GAR *515,455* PC **A08/MF A01**

SAND-84-1118C
Diffusion of Plutonium in Compacted, Brine-Saturated Bentonite.
DE85002440/GAR *515,413* PC **A02/MF A01**

SAND-84-1122
RELAP5 Assessment: Conclusions and User Guidelines.
NUREG/CR-3936/GAR *515,457* PC **A08/MF A01**

SAND-84-1144C
Coolability of UO sub 2 with Downward Heat Removal: The D10 Experiment.
DE84017007/GAR *515,374* PC **A02/MF A01**

SAND-84-1478C
High Power Pulsed Accelerators with Potential Industrial Applications.
DE85001710/GAR *515,553* PC **A02/MF A01**

SAND-84-1712
Asymptotic Formulas for the Motion of Shaped Charge Liners.
DE85000197/GAR *515,498* PC **A02/MF A01**

SAND-84-1837C
Coolability of UO2 Debris Beds in Pressurized Water Pools: DCC-1 and DCC-2 Experiment Results.
DE84017005/GAR *515,373* PC **A02**

SAND-84-1868C
Applications of the CONTAIN 1.0 Computer Code to the Analysis of Containment Loading under Severe Accident Conditions.
DE85002430/GAR *515,383* PC **A02/MF A01**

SAND-84-1916C
Thermal-Hydraulic Uncertainties Affecting Severe Accident Progression.
DE84017381/GAR *515,434* PC **A02/MF A01**

SAND-84-1995C
Theory of Lethality.
DE85000457/GAR *515,265* PC **A02/MF A01**

SAND-84-2025C
Utility-Interactive Photovoltaic Power Conditioning Technology in the United States.
DE85002634/GAR *514,941* PC **A02/MF A01**

SAND-84-2078C
Hydrogen Flame Acceleration and Transition to Detonation.
DE85000611/GAR *515,378* PC **A02/MF A01**

SAND-84-2172C
MARCON - Development and Applications to Containment Loading Calculations.
DE85002442/GAR *515,384* PC **A02/MF A01**

SAND-84-8012
STAR: Sandia Technology Applications Ring Conceptual Design Report.
DE85002551/GAR *515,555* PC **A05/MF A01**

SAND-84-8238
Solid Particle Receiver Experiments: Velocity Measurements.
DE85000257/GAR *515,201* PC **A03/MF A01**

SAPR-4
Normal Incidence, High Resolution X-Ray Telescope for Solar Coronal Observations.
N85-13699/2/GAR *514,387* PC **A06/MF A01**

SAPR-46
Composite Structural Materials.
N85-12966/6/GAR *514,974* PC **A08/MF A01**

SASR-15
Absolute Transition Probabilities of Lines in the Spectra of Astrophysical Atoms, Molecules, and Ions.
N85-13705/7/GAR *514,393* PC **A02/MF A01**

NTIS ORDER/REPORT NUMBER INDEX

SBI-AD-E301-513
Operations FLINTLOCK and LATCHKEY Events RED HOT, PIN STRIPE, DISCUS THROWER, PILE DRIVER, DOUBLE PLAY, NEWPOINT, MIDI MIST, 5 March 1966-26 June 1967.
AD-A148 997/0/GAR *515,342* MF A01

SBI-AD-E401-178
Structures to Resist the Effects of Accidental Explosions. Volume 3. Principles of Dynamic Analysis.
AD-A148 995/6/GAR *515,190* PC A18/MF A01

SBI-AD-E401-258
Ultrasonic Inspection of Alloyed Tungsten Bars.
AD-A148 900/4/GAR *515,196* PC A02/MF A01

SBI-AD-E401-362
Evaluation of Titanium Diboride Gun Tube Coatings.
AD-A148 901/2/GAR *515,511* PC A02/MF A01

SBI-AD-E751-157
Toward a Theory of Military Involvement in National Development in Underdeveloped Countries.
AD-A148 996/8/GAR *514,497* MF A01

SBI-AD-E850-737
Equations and Algorithms for Meteorological Applications in Air Weather Service.
AD-A148 894/9/GAR *514,410* PC A04/MF A01

SBI-AD-F300-518
Effects of Perforation L/D Ratio and Slotting on Stick Propellant Combustion.
AD-A148 854/3/GAR *515,490* PC A03/MF A01

SBI-AD-F300-520
Acceleration Measurements in High G Environments.
AD-A148 896/4/GAR *515,506* PC A03/MF A01

SBI-AD-F300-523
Application of Monte Carlo and Molecular Dynamics Methods to the Calculation of Thermodynamic Properties of Molten Salts.
AD-A148 897/2/GAR *515,491* PC A02/MF A01

SBI-AD-F300-524
Projectile Motion in a Flexible Gun Tube.
AD-A149 022/6/GAR *515,507* PC A05/MF A01

SBI-AD-F300-525
Hypothetical Zero Yaw Drag Trajectory of Spinning Projectiles between M = 5 and M = 10.
AD-A148 899/8/GAR *515,492* PC A03/MF A01

SBI-AD-F650-094
Combat Battle Damage Assessor Expert System.
AD-A148 898/0/GAR *515,268* PC A02/MF A01

SCIENTIFIC SER-33A
Tendencias Recentes na Metodologia de Levantamentos Demograficos em Paises em Desenvolvimento (Recent Methodological Trends in Demographic Investigation in Developing Countries).
PB85-140119/GAR *514,551* PC A02/MF A01

SCIENTIFIC-1
Solar Radio Bursts, Proton Events and Geomagnetic Activity.
AD-A149 018/4/GAR *514,385* PC A03/MF A01

SDL-84-2361-01
Electro-Optic Spatial Light Modulator for Thermo-Elastic Generation of Programmably Focused Ultrasound.
AD-A149 078/8/GAR *515,550* PC A02/MF A01

SERI/PR-253-2188
Solar Thermal Technology. Annual Evaluation Report, Fiscal Year 1983.
DE84013029/GAR *514,877* PC A06/MF A01

SERI/SP-231-2486
Microalgae Culture Collection, 1984-1985.
DE84013035/GAR *514,569* PC A04/MF A01

SERI/SP-254-1536D
Design of Energy-Responsive Commercial Buildings.
DE84013046/GAR *515,062* PC A15/MF A01

SERI/TP-214-2374
Observed Acoustic and Aeroelastic Spectral Responses of a MOD-2 Turbine Blade to Turbulence Excitation.
DE84013012/GAR *514,876* PC A02

SERI/TP-251-2424
Hydrogen from Solar Energy.
DE85001914/GAR *515,633* PC A02/MF A01

SERI/TR-235-2983
Dissociated Methanol Citation. Final Report.
DE85000505/GAR *515,620* PC A12/MF A01

SERI/TR-252-1951
Performance of the SERI (Solar Energy Research Institute) Parallel-Passage Dehumidifier.
DE85000509/GAR *515,066* PC A04/MF A01

SERI/TR-252-2497
High Performance Solar Desiccant Cooling System: Performance Evaluations and Research Recommendations.
DE85000508/GAR *515,065* PC A04/MF A01

SERI/TR-255-2177-V.1
Effect of Ultraviolet Radiation on Transparent Polymer Films as Determined Using in Situ FTIR-RA Spectroscopy. Volume I. Photodegradation of Transparent Polymer Films.
DE84013039/GAR *515,011* PC A03/MF A01

SGD-483-PT-1
Solar-Geophysical Data Number 483, November 1984. Part 1 (Prompt Reports). Data for October 1984, September 1984 and Late Data,
PB85-147692/GAR *514,402* PC A05/MF A01

SGD-483-PT-2
Solar-Geophysical Data Number 483, November 1984. Part 2 (Comprehensive Reports). Data for May 1984, December 1981 and Miscellanea,
PB85-147700/GAR *514,403* PC A06/MF A01

SHR-0011623/GAR
Adolescent Pregnancy and Childbearing: Findings from Research,
SHR-0011623/GAR *514,563* PC A16/MF A01

SHR-0012016/GAR
Study of English Language Training for Refugees in the United States. Phase 3: The Influence of Language Training and Employment on Adult Refugees' Acquisition of English.
SHR-0012016/GAR *514,513* PC A03/MF A01

SLAC/AP-33
Single-Cavity SLED Device.
DE85002587/GAR *515,556* PC A02/MF A01

SLAC-CN-282
Notes on the RF System for the SLC Positron Source.
DE85002628/GAR *515,558* PC A02/MF A01

SLAC-PUB-3445
Proposal for Hollow Cathode Electron Gun for Electron Cooling.
DE85002721/GAR *515,559* PC A02/MF A01

SLAC-PUB-3460
4 pi Detectors.
DE85002605/GAR *515,359* PC A02/MF A01

SLAC-PUB-3484
Versatile CAMAC Power Supply Controller-Monitor with Built-in Ramping and Ripple Monitor.
DE85002686/GAR *515,210* PC A02

SNIAS-841-320-101
Technologies des Missiles Tactiques: Recherches et Perspectives d'Avenir (Tactical Missiles Technologies. Research and Prospectives).
N85-12925/2/GAR *515,276* PC A03/MF A01

SNIAS-841-501-101
L'Electroformage du Nickel (Electroforming of Nickel).
N85-13085/4/GAR *515,148* PC A03/MF A01

SNIAS-842-111-101
Un Systeme de Documentation Electronique (An Electronic Documentation System).
N85-13683/6/GAR *514,449* PC A02/MF A01

SNIAS-842-422-101
Essais de Susceptibilite a Une Agression Electromagnetique (Tests for Susceptibility to Electromagnetic Attack).
N85-13154/8/GAR *515,345* PC A02/MF A01

SNIAS-842-422-102
Optimisation de l'Injection des Thermoplastiques Thermostables Peek Renforces de Fibres Courtes de Carbone (Optimization of the Injection Process for Thermostatic Polyether-Ether-Ketone (Peek) Thermoplastics Reinforced with Short Carbon Fibers).
N85-13062/3/GAR *515,013* PC A02/MF A01

SNIAS-842-422-104
Improvement of Lightning Arresters Energy Capability.
N85-13172/0/GAR *514,794* PC A02/MF A01

SNIAS-842-551-101
Les Materiaux Structuraux Modernes Situation Actuelles et Perspectives d'Evolution (Modern Structural Materials. Present Situation and Evolution Prospects).
N85-12866/6/GAR *514,335* PC A04/MF A01

SOL-84-8
Economic Growth and Dynamic Equilibrium.
DE85002811/GAR *514,462* PC A03/MF A01

SOLAR/0011-84/02
Solar Energy System Case Study, Oakmead Industries, Santa Clara, California.
DE85002078/GAR *515,069* PC A08/MF A01

SPRU/OP/SER-18
Worldwide Nuclear Plant Performance Revisited: An Analysis of 1978-81 Experience.
PB85-143188/GAR *515,468* PC E04/MF E04

SPRU/OP/SER-19
UK (United Kingdom) Industrial Energy Demand: Economic and Technical Change in the Steam Boiler Stock.
PB85-144293/GAR *514,948* PC E06/MF E06

SPRU/OP/SER-22
Technical Change in a Newly Industrializing Country: A Case Study of the Impacts on Employment and Skills in the Brazilian Textiles Industry.
PB85-143733/GAR *514,537* PC E08/MF E08

SSS-FR-84-01-V-1
Definition of Technology Development Missions for Early Space Station Satellite Servicing. Volume 1. Executive Summary.
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N85-12923/7/GAR *515,708* PC A08/MF A01

STF15-A84047
Ventilation Efficiency. Part 4. Displacement Ventilation in Small Rooms,
PB85-140879/GAR *515,073* PC E05/MF E05

STF15-A84048
Experimental Study of Turbulent Jet Diffusion Flames (Revised Version),
PB85-140929/GAR *515,599* PC E04/MF E04

STF15-A84057
Ventilation Efficiency. Part 6. A Survey of Concepts of Ventilation Effectiveness,
PB85-140887/GAR *515,074* PC E04/MF E04

STF17-A84042
Basis for a Geometric Modeller,
PB85-140861/GAR *514,837* PC E03/MF E03

STF44-A84167
Modelling, Implementation and Use of a Traffic Simulator for NPDN (Nordic Public Data Network),
PB85-140838/GAR *515,292* PC E04/MF E04

STI-90112-401-2FR
Theoretical Study of the Optical Properties of Diesel Particles.
PB85-144368/GAR *514,715* PC A04/MF A01

STMPO-493
Medium Power Transformers, 115 KV and Below with and Without LTC.
DE85001377/GAR *514,788* PC A04/MF A01

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Synthesis of Some Highly Silylated Aminophosphines and Their Reactions with Carbon Tetrachloride.
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Some Addition and Complexation Reactions of a Silylated Amino(Methylene)Phosphine.
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TOP-1-2-502
US Army Test and Evaluation Command Test Operations Procedure 'Durability'.
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TPRD/M/1355/N84
Shape of the Fusion Boundary in an Electromagnetically Stirred Weld Pool,
PB85-138774/GAR *515,154* PC E04/MF E04

TPRD/M/1409/N84
Modifications to FURDEC (Furnace Heat Transfer Program) to Include Self-Consistent Flame Modelling,
PB85-143154/GAR *515,075* PC E04/MF E04

TPRD/M/1435/N84
Sodium Chemistry in the MEL In-Sodium Creep Facilities,
PB85-143139/GAR *515,237* PC E04/MF E04

TPRD/M/1436/N84
Air Abrasive Equipment for the Measurement of Residual Stresses in the Bores of Pipes and Tubes,
PB85-143170/GAR *515,180* PC E03/MF E03

TR-ONR-DG-09
Objective and Social Factors as Determinants of Task Perceptions and Responses: An Integrative Framework and Empirical Investigation.
AD-A149 081/2/GAR *514,546* PC A04/MF A01

TR-2
Gel Drawn Fibers of Poly(Vinyl Alcohol).
AD-A149 062/2/GAR *515,010* PC A03/MF A01

TR-03-542-027-VOL-1/2
Hill AFB, Utah Installation Restoration Program. Phase IIB, IRP Survey. Volume 1. Text. Volume 2. Appendices.
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Simple Model for Predicting the Flux Distribution through the Focal Plane of a Multifaceted-Concentrator Solar Furnace.
AD-A149 063/0/GAR *515,059* PC A02/MF A01

TR-8
Metal-Catalyzed Rearrangement of Alkene-Alkynes and the Stereochemistry of Metallacyclobutene Ring Opening.
AD-A149 064/8/GAR *514,690* PC A02/MF A01

TR-10
Effect of Powder Characteristics on Microstructure and Properties in Alkoxide Prepared PZT Ceramics.
AD-A149 082/0/GAR *514,958* PC A03/MF A01

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Robustesse de Regulateurs de Pilotage Multivariables (Strength of Multivariable Piloting Regulators),
PB85-141570/GAR *514,344* PC E08/MF E08

TR-12/7224/SY
Robustesse des Regulateurs de Pilotage Multivariables Continus: Synthese de l'Etude (Strength of Continuous Multivariable Piloting Regulators: Study Synthesis),
PB85-140853/GAR *514,343* PC E04/MF E04

TR-14
Pulsed Photothermal Radiometry for Remote Sensing of Spectroscopic and Physical Properties of Thin Film.
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TR-25
High Resolution Electron Energy Loss Studies of Fermi-Level States of Clean and Metallized Si(111) Surfaces.
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TR-40/7086/M
Interaction Fatigue - Fluage dans les Composites Carbone/Resine + or - 45 degrees (Interaction Fatigue - Creep in Carbon/Resin Compounds + or - 45 degrees),
PB85-141568/GAR *514,992* PC E04/MF E04

TR-72
More Limit Theory for the Sample Correlation Function of Moving Averages.
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Surface-Wave Displacement: Absolute Measurements Using a Capacitive Transducer.
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Acoustic Emission Transducer Calibration by Means of the Seismic Surface Pulse.
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Design of a Knowledge-Based Fault Detection and Diagnosis System,
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Synthesis of Some Highly Silylated Aminophosphines and Their Reactions with Carbon Tetrachloride.
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Spillway Deflectors at Bonneville, John Day and McNary Dams on Columbia River, Oregon-Washington and Ice Harbor, Lower Monumental and Little Goose Dams on Snake River, Washington. Hydraulic Model Investigation.
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TR-116-1
Dworshak Dam, North Fork Clearwater River, Idaho. Hydraulic Model Investigation.
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Vibrational Power Transmission of an Idealised Gearbox.
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W.E. Johnson's 'Sufficientness' Postulate.
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